MINERALOGICAL ABSTRACTS

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Notices of Books.

Doelter (C.) [1850–1930]. *Handbuch der Mineralchemie.* Dresden & Leipzig (T. Steinkopff), 1919–21, vol. 2, pt. 3; 1919–24, vol. 3, pt. 2 (nos. 7–10).

—— & Leitmeier (H.). *Idem*, 1925–26, vol. 3, pt. 2 (nos. 11–14); 1925–31, vol. 4, pts. 1–3.

This great work of reference, commenced by C. Doelter in 1911 [Min. Mag. **16**–161], has now been brought to a successful conclusion by H. Leitmeier, whose name first appeared as joint-editor in 1925. As a guide to the literature it is invaluable, but it must be used critically. The nine thick volumes contain 9,508 pages with 745 illustrations and occupy two feet of shelf-space. The concluding number contains, after the index to vol. 4, pt. 3, a general index of mineral names to the whole work. The price of the whole set is 476 Mk. (bound in half-leather 520 Mk.). The contents of the earlier volumes have already been quoted [M.A. **1**–118]; the remainder are:

Vol. 2, pt. 3 (nos. 13–15), 1919–1921, xii + 472 pp., 6 figs. Silicates of trivalent metals.

Vol. 3, pt. 2 (nos. 7–14), 1919–1926, xvi + 1,244 pp., 140 figs. Li, Na, K, Cu, Rb, Ag, Cs, Au, Be, Mg, Ca, Zn, Sr, Cd, Ba, Hg, Ra, B, Al, Ga, In, Tl, rare-earths, Fe, Mn, Co, Ni, Pt metals.

Vol. 4, pt. 1 (nos. 1–6), 1925–1926, xx + 1,003 pp., 71 figs. Sulphur compounds.

—— pt. 2 (nos. 7–15), 1926–1929, xx + 1,494 pp., 218 figs. Sulphates, Cr, Mo, W, U, haloid salts and salt deposits.

—— pt. 3 (nos. 16–22), 1929–1931, xxii + 1,174 pp., 1 pl., 109 text-figs. Haloid salts, rare gases, organic compounds.

L. J. S.

Shand (S. J.). *The study of rocks.* London (T. Murby & Co.) & New York (D. Van Nostrand Co.), 1931, xi + 224 pp., 1 diagram. Price 6*s*.

This book will be more immediately useful to advanced students and teachers than to those beginning the study of petrology. It presupposes a sound knowledge of geology and some acquaintance

with rocks in the field and in the laboratory as well as with the nomenclature in general use. For those so equipped the book will be found both entertaining and stimulating. Chapters IV to VIII on the eruptive rocks provide a commentary on existing nomenclature and classifications and present, in a quite attractive form, the author's own system [M.A. **3**–317, **4**–124]. Examples of rocks in the various divisions are chosen from all countries where the quantitative data, which are essential for the author's system, have been supplied. This should give the book a wide appeal, but for lack of quantitative descriptions many well-known rocks have found no place in the book, and this is unfortunately especially true of rocks described by British and European petrographers. The five chapters on sedimentary rocks follow normal lines and the generally accepted classification is adopted with some slight rearrangement. Two chapters on metamorphic rocks include a criticism of existing classifications and a suggestion for a new one. The groups chosen are: I, mylonites; II, 'hornstones' (i. e. hornfelses), quartzites, and marmorites (lime-silicate-rocks or lime-silicate-'hornstones'); and III, crystalline schists. The last group is subdivided according to the ratio of alumina to bases in the characteristic minerals. There is a brief appendix on the chemical analysis of rocks, and at the end of each chapter a short list of books and papers recommended for reading.

W. C. S.

Tickell (Frederick G.). *The examination of fragmental rocks*. Stanford University Press & Oxford University Press, 1931, x + 127 pp., 12 pls., 35 text-figs. Price $5.00 = 23*s*.

Mineralogists and geologists are indebted for many of the methods used in sedimentary petrography to technique developed in petroleum research. The author presents an account of the methods now in use, including also some employed in the study of pigments and other very finely divided materials. A chapter on 'size analysis' contains a useful explanation of various graphical methods. Other chapters deal with porosity and permeability, the preparation of specimens (including methods of separation), and the identification of minerals. There is a good brief account of the method of spectrographic examination, and an illustration of an improvised rotation apparatus for tilting and rotating grains mounted on a cover-glass about two axes at right angles. Two pages of figures of 'orientation-cleavage diagrams' for eighteen minerals show the relation of optic

axes to the directions of cleavage and to the crystallographic axes. The final chapter gives brief descriptions of minerals, arranged in alphabetical order, and abridged determinative tables somewhat on the lines adopted in A. Johannsen's 'Key for the determination of rock-forming minerals in thin sections' (1908), but omitting the distinction based on birefringence relative to that for quartz.

W. C. S.

Johannsen (Albert). *A descriptive petrography of the igneous rocks.* Vol. 1, *Introduction, textures, classifications and glossary.* University of Chicago Press, 1931, xxii + 267 pp., 1 pl., 146 text-figs. [Cambridge University Press. Price 21*s.*]

To judge from vol. 1, this promises to be an important text-book, but there is no indication of how many volumes there are to follow. A large part (pp. 51–158) is taken up with a clear outline of the various kinds of classification that have hitherto been proposed; including a quantitative mineralogical classification devised by the author himself [M.A. **2**–3] in which five groups of rock-forming minerals (quartz, potash-felspars, soda felspars, lime-felspars, and felspathoids) are set at the corners of two tetrahedra placed face to face. A quotation in some foreign language is placed at the head of each chapter, but the author's own opening sentences are often more amusing: e.g. chapter I opens with 'In the good old days when men were naturalists and not geologists, and petrologists were unknown . . . rocks were named from their megascopic characteristics'; and chap. IV with 'Many and peculiar are the classifications that have been proposed for igneous rocks'. Pages 159–263 are occupied with useful glossaries in which German terms (some quite out of place) are given even more prominence than English. At the end are tables for calculating the molecular ratios of rock analyses. The illustrations, including several diagrams, are good, and the portraits of well-known petrologists (W. Cross, J. P. Iddings, K. C. von Leonhard, F. Loewinson-Lessing, P. Niggli, A. Osann, L. V. Pirsson, H. Rosenbusch, S. J. Shand, J. H. L. Vogt, H. S. Washington, A. G. Werner, F. von Wolff, and F. Zirkel) afford a pleasing contrast to the photomicrographs of rock sections. The many bibliographical references have been carefully checked; but the index has evidently not been made by the author himself, for it shows but a poor idea of classification and arrangement. The book is well printed on smooth but poor quality paper.

L. J. S.

Ries (H.) & Watson (Thomas L.) [1871–1924]. *Engineering geology.* Fourth edition, New York (J. Wiley & Sons) & London (Chapman & Hall), 1931, vii + 708 pp. + pp. 446 a–446 t, 88 pls., 253 text-figs. Price 25*s*.

This text-book remains practically the same as the third edition of 1925 [M.A. **2**–477]. The pagination and figures are the same, but there are a few additional references to the literature, and a new chapter (pp. 446 a–446 t) on 'Geology of reservoirs and dam sites' has been added. The 'plates' in most cases are printed in with the text and bear also the pagination numbers, while some other figures which occupy a whole page are not raised to 'plate' rank. The book is very clearly printed and well illustrated. L. J. S.

Vernadsky (W. J.). *Geochemie in ausgewählten Kapiteln.* Translated by E. Kordes, Leipzig (Akademische Verlagsgesellschaft), 1930, xii + 370 pp. Price 23 Mk. (bound, 25 M.).

This is a German translation with some corrections and additions from the Russian edition of 1927 of the author's 'Geochemistry'. [M.A. **2**–416, **3**–462]. L. J. S.

Schmid (Leopold). *Bernstein.* Dresden & Leipzig (T. Steinkopff), 1931, reprinted from C. Doelter's Handbuch der Mineralchemie, vol. 4, pt. 3, pp. i–vii, 842–943. Price 7 Mk.

This pamphlet of 109 pages collects together from the scattered literature a large amount of information respecting the occurrence, physical and chemical characters, mining and working, &c., of amber. Several varieties and amber-like resins are also dealt with. The detailed bibliography given at the end of each section amounts to 613 items. The pamphlet is issued as a separate from C. Doelter's 'Handbuch der Mineralchemie', and in this form it will reach a much wider circle of readers interested in the subject. In the historical section and in the list of names for amber in various languages there is no mention of ἤλεκτρον. L. J. S.

Schneiderhöhn (Hans). *Mineralische Bodenschätze im südlichen Afrika.* Berlin (N.E.M.-Verlag), 1931, viii + 111 pp., 1 pl., 114 text-figs. Price 18 Mk.

This quarto brochure printed in double column is a collection with some additions of a series of seven articles that appeared in the journal 'Metallwirtschaft' during 1929–30. It gives an interesting description of the several mining districts in Cape Province, Transvaal, South-West Africa, Southern and Northern Rhodesia, and Katanga

that were visited during the well-organized excursions of the 15th International Geological Congress in South Africa in 1929. It is well illustrated by sketch-maps, diagrams, and photographs, many of the last taken by the author himself. There are contributions on the diamond deposits by E. Kaiser and on the coalfields by P. Kukuk.

L. J. S.

Brauns (Reinhard). *Flüssige Kristalle und Lebewesen.* Stuttgart (E. Schweizerbart'sche Verlagsbuchhandlung), 1931, xi + 111 pp., 1 pl. Price 9 Mk. (bound 10 Mk.).

This is a reprinted collection from the Neues Jahrbuch and the Centralblatt für Mineralogie of a series of 172 abstracts of papers on liquid crystals. They cover the period 1881–1931, but the early paper (1881) describes the double refraction due to strain in a rotating liquid. Otto Lehmann's discovery of liquid crystals was made in 1889. R. Brauns (by whom the majority of the abstracts had been written) contributes an interesting historical introduction, with biography and portrait of O. Lehmann. Suggestions have at times been made of some connexion between liquid crystals and life.

L. J. S.

Fitch (A. A.). *Spectrum analysis in mineralogy.* London (Adam Hilger), [1931], 52 pp., 8 figs. Price 1*s.* 9*d.*

An outline is given of the technique for the spectrum analysis of minerals. This is followed by a long list of minerals (pp. 20–44) quoting from the literature the chemical elements that have been detected by spectrum analysis. The localities of each mineral are also quoted, but with a surprising number of errors. A useful bibliography of 91 items is appended (also not free from errors and with a duplicated alphabetical arrangement of authors). L. J. S.

Bibliographies.

Kravtzoff (G.). *Table des matières des volumes I à V, années 1910 à 1922. Tables annuelles de constantes et données numériques de chimie, de physique, de biologie et de technologie.* Paris (Gauthier-Villars et Cie) & New York (McGraw-Hill Book Co.), 1930, lxiii + 382 pp. Price 400 frs. = £3 4*s.*

The 'analytic index' (pp. xxv–lxiii) amalgamates the tables of contents of the first five volumes (seven volumes covering the literature up to 1926 have been published), giving all the main and subheadings. The alphabetical index (pp. 1–62) of subjects gives many

cross-references in English, German, and Italian to the main entries in French. The largest part of the volume is occupied by the formula index of chemical compounds. References are given to more than 20,000 substances, and the volume will be of great help to the searcher for numerical data. L. J. S.

Spencer (L. J.) & Mathieu (M.). *Données numériques de cristallographie, minéralogie, structure des cristaux par les rayons X.* Paris (Gauthier-Villars et Cie) & New York (McGraw-Hill Book Co.), 1930, extrait du vol. 7 (for 1925–26), Tables annuelles de constantes et données numériques, xix pp. + pp. 1455–1522.

A continuation of earlier volumes [M.A. **4**–50], taking the literature for the years 1925–26. The section on X-rays and crystal-structure is now compiled by M. Mathieu. L. J. S.

Gamble (William B.). *Asbestos. A list of references to material in the New York Public Library.* New York, 1929, 72 pp. Price 50 cents.

Entries 1–1075 under authors (or first word of title in case of anonymous articles) give the titles of books (including many mineralogical text-books) and articles in magazines and trade journals dealing with asbestos from all points of view—we find, for instance, an entry 'Asbestos whiskers for Santa Claus'. Entries 1076–1594 deal with patents. An indication of the nature of the contents is given in each case, and there is a useful subject-index. L. J. S.

Geological literature added to the Geological Society's Library during the year ended December 31st, 1928. [No. 31], London (Geol. Soc.), 1929, iii + 237 pp. Price 10*s*.

—— *year . . . 1929.* [No. 32], London, 1930, iii + 245 pp. Price 10*s*.

Author- and subject-indexes are given. [M.A. **4**–51].

Annotated bibliography of economic geology for 1928. Economic Geology Publishing Co., 1929, vol. 1, x + 380 pp.

—— *for 1929.* 1930, vol. 2, no. 1, vi + 208 pp.; no. 2, pp. i–ix + 209–574.

—— *for 1930.* 1931, vol. 3, no. 1, ix + 248 pp.; no. 2, pp. i–ix + 249–477. Price $5.00 per ann. [Cf. M.A. **4**–51].

This useful series of brief abstracts of papers on economic geology has been prepared under the auspices of the National Research

Council [of the United States of America] with Waldemar Lindgren as chairman of committee, John M. Nickles as editor, and a staff of 44 abstractors. The place of publication is not stated. The volume issued for 1928 lists 1,756 numbered papers, articles, and books, giving the author's name, title in most cases as in the original with English translation, bibliographical reference, and a brief statement of the scope and contents. These are grouped under the headings: General and miscellaneous, areal, mineralogy and petrology, technique, metals (iron, &c.), non-metals, coal, petroleum, water, soils, engineering geology, and geophysical prospecting. There is a detailed alphabetical index of authors, subjects, and localities. The volumes for 1929 and 1930 are each issued in two parts with continuous pagination, but with two sets of numbers for the abstracts and separate alphabetical indexes. The volume for 1929 includes 979 + 1,501 titles, and that for 1930 1,110 + 1,050 titles. L. J. S.

Nickles (John M.). *Bibliography of North American Geology 1919–1928.* Bull. U. S. Geol. Survey, 1931, no. 823, 1005 pp. Price $1.25.

Full titles of papers and books arranged under authors are followed by a detailed subject-index (pp. 695–1005). The bibliography for 1927–28 is included, and will not be published as a separate bulletin. [M.A. **4**–51]. L. J. S.

Jones (T. A.). *List of papers, etc. on the geology of the country round Liverpool from 1920 to 1929.* Proc. Liverpool Geol. Soc., 1930, vol. 15, pp. 248–266.

Titles of papers with brief abstracts arranged under each year. This is the seventh decadal list, the first being for papers up to 1869. L. J. S.

Sandegren (R.). *Förteckning över svensk geologisk, paleontologisk, petrografisk och mineralogisk litteratur för år 1927.* Geol. För. Förh. Stockholm, 1929, vol. 50 (for 1928), pp. 788–798.

——*för år 1928.* Ibid., 1930, vol. 51 (for 1929), pp. 580–588. [Cf. M.A. **2**–482].

Sandegren (R.) & Magnusson (N.). *Revue annuelle de la littérature géologique suédoise 1929.* Ibid., 1931, vol. 52 (for 1930), pp. 689–754. Price of separate 2 kr.

Titles of papers published in Swedish journals during the years 1927 and 1928 arranged according to authors. For 1929 titles are

followed by abstracts written in English, French, or German, and when the original paper is in Swedish a longer abstract is given. These abstracts are grouped under various headings, mineralogy and crystallography, ores, petrography, &c. L. J. S.

Köhler (A.) & Marchet (A.). *Index 1929. Deutsches Sprachgebiet. Teil I: Arbeiten aus Gesellschaftsschriften und Zeitschriften allgemeinen Inhaltes, aus besonderen mineralogischen, petrographischen und geologischen Zeitschriften.* Min. Petr. Mitt. (Tschermak), 1931, vol. 41, pp. 106–128.

Blittersdorf (H.). *Teil II: Chemische und technisch eingestellte Zeitschriften.* Ibid., pp. 240–258.

Rösch (S.). *Teil III: Deutsche Literatur über Petrographie und Nachbargebiete, die selbständig, nicht in Zeitschriften, erschienen ist.* Ibid., pp. 258–264.

Titles of papers published in German during 1929 are arranged under authors in the following main groups: mineralogy, petrography, meteorites, physical chemistry and metallography, analytical chemistry, and miscellaneous. The three parts should surely have been incorporated into one: the fact that a paper is published in the journal of a scientific society, in a technical journal, or issued separately is an unessential detail. A useful list of German periodicals is given. L. J. S.

Cornelius (H. P.). *Verzeichnis der im Jahre 1928 erschienenen Arbeiten geologischen, geomorphologischen, mineralogischen, paläontologischen, montanistischen und hydrologischen Inhaltes, welche auf das Gebiet der Republik Österreich Bezug nehmen; nebst Nachträgen aus den Vorjahren.* Verh. Geol. Bundesanstalt, Wien, 1929, pp. 253–273.

List of titles of papers, &c., arranged according to authors, relating to the geology, mineralogy, &c., of Austria, published in 1928.

L. J. S.

Bentivoglio (Tito). *Bibliografia geo-mineralogico e paleontologica del Modenese e Reggiano 1916–1920.* Atti Soc. Nat. Mat. Modena, 1929, ser. 6, vol. 8 (60), pp. 179–198.

Titles are given under each year with a brief description of the contents of articles and papers. There are indexes of authors and localities. L. J. S.

Danysz-Fleszarowa (*Mme* R.). *Bibljografja geologiczna Polski.—Bibliographie géologique de Pologne.* No. 4 for 1925, 11 pp.; No. 5 for 1926, 12 pp.; No. 6 for 1927, 15 pp.; No. 7 for 1928, 20 pp.; No. 8 for 1929, 16 pp. [Cf. M.A. **2**–482, **3**–231].

Titles of papers relating to the geology and mineralogy of Poland arranged for each year under authors. In No. 7 a list of journals is given. L. J. S.

Wykaz prac polskich treści krystalograficznej, mineralogicznej i petrograficznej ogłoszonych w latach 1928–1929.—Table des travaux cristallographiques, minéralogiques et pétrographiques publiés en 1928–1929. Arch. Min. Tow. Nauk. Warszawa (Arch. Min. Soc. Sci. Varsovie), 1929, vol. 5, pp. 108–115.

—— [for 1930, with supplement for 1929]. Ibid., 1930, vol. 6, pp. 138–143. [Cf. M.A. **4**–51].

Titles of papers published by Polish authors. L. J. S.

Bibliographia geologica Hungarica annorum 1916–24. Földtani Közlöny, Budapest, 1925, vol. 54 (for 1924), pp. 227–256.

—— *anni 1925.* Ibid., 1926, vol. 55 (for 1925), pp. 395–400.

—— *anni 1926.* Ibid., 1927, vol. 56 (for 1926), pp. 261–267.

Bibliographia geologica Hungariae. Supplementum bibliographiae annorum ultimorum. Bibliographia annorum 1927–1928. Ibid., 1929, vol. 58 (for 1928), pp. 245–256.

Literatura geologica Hungarica pro anno 1929. Ibid., 1930, vol. 59 (for 1929), pp. 134–139.

Titles of papers arranged alphabetically under authors. [M.A. **3**–231]. L. J. S.

Milojević (Sreten P.). Милојевић (Сретен П.). Геолошка библиографија Балканскога Полуострва за годину 1927.—*Bibliographie géologique de la Péninsule Balkanique pour l'an 1927.* Геол. Анал. Балкан. Полу. (Ann. Géol. Pénins. Balkan.), 1930, vol. 10, pt. 1, 170–184.

—— *Ditto for 1928.* Ibid., 1931, vol. 10, pt. 2, pp. 148–165.

110 titles for 1927 and 123 for 1928 are arranged under authors. [M.A. **3**–231]. L. J. S.

Sparn (Enrique). *Bibliografía de la geología, mineralogía y paleontología de la República Argentina.* Acad. Nac. Cienc. Córdoba, 1925, Misc. no. 11, pp. 57 + viii.

A collection of 324 titles for the years 1922–24 arranged under

authors; with a short index of subjects and localities. A supplement to the previous lists of this series [M.A. **3**–231] gives 70 additional titles for the period 1915–21. L. J. S.

Henglein (M.). *Repertorium zum Neuen Jahrbuch und Centralblatt für Mineralogie, Geologie und Paläontologie für die Jahrgänge 1925–1929. I. Personen-Verzeichnis.* Stuttgart, 1930, 472 pp. Price 52 Mk. [Cf. M.A. **3**–230].

This covers the literature for the period 1925–29, giving the full original titles of papers arranged under authors. The old 'Neues Jahrbuch für Mineralogie', started in 1807, has recently been subdivided into no less than seven separate serials: Referate [Abstracts] I Crystallography and mineralogy, II General geology, petrography, and ore-deposits, III Historical and regional geology and palaeontology; Beilage-Bände A. Mineralogy and petrography, B. Geology and palaeontology; Centralblatt A and B; and there is also a 'Sonderband'. L. J. S.

Mineralogische und Petrographische Mitteilungen, begründet von G. Tschermak. Register zu den Bänden XXVI–XL. Min. Petr. Mitt. (Tschermak), 1930, vol. 40, pp. 447–534.

Alphabetical indexes of authors and of subjects to the fifteen volumes for the years 1907–30. The pagination of the index carries on from the end of volume 40, and is followed by another pagination devoted to 'Mitteilungen der Wiener Mineralogischen Gesellschaft'. With vol. 40 (1929–30) of 'Tschermak's Mitteilungen' the publication was taken over by the Akademische Verlagsgesellschaft in Leipzig and it now becomes Abteilung B of the 'Zeitschrift für Kristallographie, Mineralogie und Petrographie', Abteilung A being the 'Zeitschrift für Kristallographie' ('Groth's Zeitschrift'). The complex system of abstracts is divided between these two sections. L. J. S.

Sandegren (Ragnar). *Generalregister till Band 42–50 eller årgångarna 1920–1928 av Geologiska Föreningens i Stockholm Förhandlingar.* Stockholm, 1930, 77 pp. Price 6 kr.

This general register to vols. 42–50 (1920–28) of the Proceedings of the Geological Society of Stockholm contains an author's index giving full titles of papers, and an alphabetical index of subjects and localities. L. J. S.

Schweizerische Mineralogische und Petrographische Mitteilungen. Inhaltsverzeichnis, Band I–X. Schweiz. Min. Petr. Mitt., 1930, vol. 10, pp. 502–508.

Titles of papers grouped under headings crystallography and crystal-optics, minerals and mineral-chemistry, mineral- and ore-deposits, chemistry of rocks, petrography and geology, &c. The ten volumes cover the period 1921–30. L. J. S.

History.

Ruska (Julius). *Tabula Smaragdina. Ein Beitrag zur Geschichte der hermetischen Literatur.* Heidelberger Akten der von-Portheim-Stiftung, no. 16, Heidelberg (C. Winter), 1926, vii + 248 pp.

From a babel of words in many languages an attempt is made to arrive at some concordance (perhaps meaning) between the several texts and commentaries of the Tabula Smaragdina. This is one of the oldest and most famous of alchemical tracts and is usually ascribed to Hermes Trismegistos (the Egyptian god Thoth), but it is of unknown date. It was first printed in 1541. Throughout the present volume there are scattered references to minerals and gem-stones, but the descriptions are too vague for identification. Smaragd (Arabic, zabarǵad or zumurrud) is said to be a corundum (Arabic, jāqūt) in which the red or blue colour has been changed to green by the action of heat [cf. M.A. **2**–496]. The hard green gem-stone obtained by the ancients from Cleopatra's emerald mines in eastern Egypt was a beryl, and is now called emerald (German, Smaragd; Russian, izumrud). The modern term 'Oriental emerald' for green corundum suggests a reversion to perhaps an older meaning. [See E. J. Holmyard, The Emerald Table, Nature, London, 1923, vol. 112, p. 525.] L. J. S.

Ruska (Julius). *Arabische Alchemisten. I. Chālid ibn Jazīd ibn Mu'āwija.* Heidelberger Akten der von-Portheim-Stiftung, no. 6, Heidelberg (C. Winter), 1924, 56 pp. Price 3 Mk.

II. Ǵa'far alṢādiq, der sechste Imām. Ibid., no. 10, Heidelberg (C. Winter), 1924, 128 pp., with 31 double pages of Arabic text. Price 7·50 Mk.

Accounts of the life and writings of the Arabian alchemists Chālid ibn Yazīd ibn Mu'āwiya (665 *c.*–704 A.D.) and Ǵa'far al Ṣādiq (700–765 A.D.). Brief mention is made of various minerals. L. J. S.

Sagui (Cornelio L.). *Economic geology and allied sciences in ancient times.* Econ. Geol., 1930, vol. 25, pp. 65–86, 9 figs.

The ancient writers give only fragmentary information on mining and the extraction of metals in Greek and Roman times; but the positions of the ancient workings in Greece, Italy, Spain, &c., indicate that the workers must have had some knowledge of the geology of ore-deposits. L. J. S.

Read (B. E.) & Pak (C.). *A compendium of minerals and stones used in Chinese medicine, from the Pen T'sao Kang Mu, Li Shih Chen, A.D. 1597.* Peking Soc. Nat. Hist. Bull., 1928, vol. 3, pt. 2, vii + 120 pp. Price $1.50.

The 'Pen T'sao Kang Mu' is a compilation by Li Shih Chen of all that was then (1597) known of the animal, vegetable, and mineral kingdoms, and it is still the chief reference book in Chinese for all branches of natural history. Vols. 8–12, dealing with metals, precious stones, stones, and salts, appear to form a complete treatise on mineralogy. The present authors give the old and modern Chinese names for the various materials and attempt to establish their identity, giving numerous references to the more recent literature. A bibliography is given, and indexes of English and Chinese (Romanized) names. L. J. S.

Steno (Nikolaus) [1638–1686]. *Vorläufer einer Dissertation über feste Körper, die innerhalb anderer fester Körper von Natur aus eingeschlossen sind.* Übersetzung von Karl Mieleitner [1890–1923]. Ostwald's Klassiker der exakten Wissenschaften, no. 209. Leipzig (Akademische Verlagsgesellschaft), 1923, 68 pp., 1 pl. Price 2 Mk.

A German translation (pp. 17–64) of the original Latin text of 1669 of Steno's classic work [Min. Mag. **18**–147]. A biography of Steno, a general description of the work, and various notes are added. The translator died while the booklet was in the press and it was completed by A. Johnsen. L. J. S.

Zenzén (Nils). *Försök till historik över Cederbaumska mineralsamlingen i Oskarshamn.* Arkiv Kemi, Min. Geol., 1930, vol. 10 A, no. 6, 98 pp., 62 figs.

An account is given of the mineral collection (3,700 specimens) formed by Peter Christopher Cederbaum (formerly Bauman) (1733–95) which is still preserved in the high school at Oskarshamn in

south Sweden. Many photographic reproductions are given of the labels written by the collectors of the period. L. J. S.

Zenzén (Nils). *Axel Fredrik Cronstedt.* Svenskt Biografiskt Lexikon, 1929, vol. 9, pp. 279–295, 1 fig.

A biography containing some new details, together with a bibliography and portrait, is given of A. F. Cronstedt (1722–65).[1] His mineral collection was sold in 1803 and has since been lost. His 'Försök til mineralogie (1758) was translated into several languages, including two editions (1770 and 1788) in English. L. J. S.

Zaunick (Rudolph). *Von der ehemaligen Gesellschaft für Mineralogie zu Dresden.* Sitzungsber. u. Abhandl. Naturwiss. Gesell. Isis, Dresden, 1928, Festschrift R. Baldauf, pp. 77–91.

A historical account is given of the Dresden Mineralogical Society, which was founded in 1816, at the instigation of A. G. Werner, by K. A. Blöde (1773–1820, after whom blödite was named). Two volumes 'Auswahl aus den Schriften der . . . Gesellschaft für Mineralogie zu Dresden' were published in 1818 and 1819, and a third little-known volume in 1826. The society then dwindled until it amalgamated between 1832 and 1835 with the Gesellschaft für Natur- und Heilkunde, afterwards known as the Naturwissenschaftliche Gesellschaft Isis. Mention is made of some other early societies, including a mining society founded in Bohemia in 1786 by Baron Ignaz von Born, and the Jena Societät für die gesammte Mineralogie in 1798 [but not the British Mineralogical Society in 1799]. L. J. S.

Lacroix (Alfred). *Notice historique sur le troisième fauteuil de la section de minéralogie.* Académie des Sciences, Institut de France, 1928, 86 pp. Paris (Gauthier-Villars et Cie).

Biographical notices are given of the deceased distinguished mineralogists and geologists who have occupied the 'third chair' of the section of mineralogy of the Académie des Sciences (Paris) to which Nicolas Desmarest (1725–1815) was first elected in 1795 on the reorganization of the 'Institut national des sciences et des arts'. The direct successors of Desmarest were: J. P. F. G. Duhamel (1730–1816), A. J. F. M. Brochant de Villiers (1772–1840), O. P. A. Petit Dufrénoy (1792–1857), Charles J. Sainte-Claire Deville (1814–76), Edmond Hébert (1812–90), F. E. Mallard (1833–94), P. G. Hautefeuille (1836–1902), C. P. E. A. Munier-Chalmas (1843–1903), A. F. A. Lacroix, G. Émile Haug (1861–1927), and L. Cayeux.

[1] Not 1702–65, as sometimes given.

The biographies are delightfully written, and there is in this volume much of the history of the foundation and progress of geology in France. W. C. S.

Lacroix (Alfred). *Notice historique sur François-Sulpice Beudant et Alfred-Louis-Olivier Legrand Des Cloizeaux, membres de la section de minéralogie.* Académie des Sciences, Institut de France (Séance publique annuelle, 15 Dec. 1930), 1930, 101 pp., 2 pls. (portraits), Paris (Gauthier-Villars et Cie).

Detailed accounts of the life and work of F. S. Beudant (1787–1850), Professor of Mineralogy in the University of Paris, and of A. Des Cloizeaux (1817–97), Professor of Mineralogy in the Natural History Museum of Paris. Appended are bibliographies of the published works of G. de Laumont (1747–1834), Count de Bournon (1751–1825), F. S. Beudant, and A. Des Cloizeaux. L. J. S.

Lacroix (Alfred). *Notice historique sur Jean-Baptiste Boussingault.* Mém. Acad. Sci. Paris, 1928, ser. 2, vol. 59, pp. i–lxxi, 1 pl. (portrait).

A biography with detailed bibliography is given of 'Joseph Dieudonné Jean Baptiste' [more usually given as Jean Baptiste Joseph Dieudonné] Boussingault (1802–87). After studying at the Mining School of Saint-Étienne he started life as a mining engineer, and later was distinguished as a chemist. The minerals gaylussite and marmatite were discovered by him in South America. Boussingaultite bears his name. L. J. S.

Picard (Émile). *La vie et l'œuvre de Jean-Baptiste Biot.* Mém. Acad. Sci. Paris, 1928, ser. 2, vol. 59, pp. i–xxxix, 1 pl. (portrait).

A detailed biography of the French physicist J. B. Biot (1774–1862). He was one of the early workers on the polarization of light in crystals, and his report on the shower of stones at L'Aigle in 1803 set at rest the last scientific doubts as to the actual fall of meteorites. The well-known mineral biotite, in which he observed pleochroism, was named after him. L. J. S.

Wallerant (F.). *La Société Française de Minéralogie de 1878 à 1928.* Bull. Soc. Franç. Min., 1930, vol. 53, pp. 1–24, 2 pls.

This note by the President gives a history of the Society and of its work, and forms the introduction to the 'Livre Jubilaire' issued on the occasion of the quinquagenary of the Society, which was founded on March 21, 1878, with the title 'Société Minéralogique de

France', and changed in 1886 to 'Société Française de Minéralogie'. The actual celebrations were, however, postponed until June 30–July 2, 1930, to coincide with the centenary celebrations of the Geological Society of France. This jubilee volume (pp. 1–482, of vol. 53 of the Bulletin) contains 24 papers by various authors, together with an address by A. Lacroix and an account of the celebrations. Portraits are given of Haüy and A. Bravais. L. J. S.

Goddard (T. Russell). *History of the Natural History Society of Northumberland, Durham and Newcastle upon Tyne, 1829–1929.* Newcastle-upon-Tyne (Andrew Reid & Co.), [1930?], xvi + 195 pp., 12 pls.

The history of this most successful Natural History Society and its museum has been well written and is illustrated by portraits of its founders. The museum contains a general reference collection of minerals. This includes the collection formed by William Hutton, one of the founders of the Society and co-author with John Lindley of 'The fossil flora of Great Britain' (1831–37). The mineral collection was purchased for the Museum in 1859 by Lord Armstrong; it had been deposited on loan by Hutton in 1831. Many minerals and rocks were presented also by Sir Walter C. Trevelyan, whose paper entitled 'Notice of a bed of whin, at Stanhope, in Weardale' appeared in the first number of the Transactions of the Society. W. C. S.

Palache (Charles). *Mineralogy 1869–1928.* Chapter XXI, pp. 332–337 in The development of Harvard University, 1869–1929, 1930.

The Harvard mineralogical collection at Cambridge, Massachusetts, was begun by Benjamin Waterhouse in 1784, and was considerably added to by J. P. Cooke, Professor of Chemistry and Mineralogy, 1850–94. The Liebener collection was acquired in 1869 and the J. L. Smith collection of meteorites in 1883. In 1895 a new Department of Mineralogy and Petrography was organized under J. E. Wolff, who was succeeded by C. Palache in 1923. In 1913 a valuable collection with a handsome endowment was bequeathed by A. F. Holden. L. J. S.

Kraus (Edward H.). *The first ten years of the Mineralogical Society of America.* Amer. Min., 1930, vol. 15, pp. 98–103.

Founded in 1920, the society took over the publication of the 'American Mineralogist', which had been commenced in 1916, and has shown a rapid advancement. L. J. S.

Milch (L.) [1867–1928]. *Zum 75. Geburtstag von V. Goldschmidt.* Festschrift Victor Goldschmidt, Heidelberg, 1928, pp. 1–16, 1 pl. (portrait).

Himmel (Hans). *Veröffentlichungen von V. Goldschmidt.* Ibid., pp. 17–24.

An appreciation of Prof. Goldschmidt's scientific work on the occasion of his seventy-fifth birthday on February 10, 1928. The bibliography includes 177 items. L. J. S.

Melville (Ilse). *Verzeichnis der Arbeiten von G. Linck.* Chemie der Erde, 1930, vol. 5, pp. 625–630.

A list of 85 titles covering the period 1878–1930 is given in this 'Festgabe für Gottlob Linck', which is issued on the occasion of his retirement, after 36 years' service, from the directorship of the Mineralogical-Geological Institute of the University of Jena. The volume contains his portrait and 27 papers. L. J. S.

New Minerals.

Aminoff (G.), with chemical analyses by R. Blix. *Arsenoklasite, a new arsenate from Långban.* Kungl. Svenska Vetenskapsakad. Handl., 1931, ser. 3, vol. 9, no. 5, pp. 52–57, 1 fig.

This occurs together with sarkinite (which it closely resembles) and adelite along fissures in dolomite impregnated with hausmannite. The red cleavage fragments are orthorhombic with the acute negative bisectrix perpendicular to a good cleavage (010), optic axial plane (100), 2E 108° 57′, 2V 53° 26′, α 1·787 [not 1·808, correction by author], β 1·810, γ 1·816. X-ray examination gives a unit cell of dimensions $a = 9{\cdot}19, b = 18{\cdot}01, c = 5{\cdot}79$ Å. ($a : b : c = 0{\cdot}510 : 1 : 0{\cdot}313$) containing four molecules $Mn_3(AsO_4)_2.2Mn(OH)_2$. Possible space-groups are V_h^1, V^{1-4}, C_{2v}^1, and C_{2v}^7. Sp. gr. 4·161, H.5–6. Analysis, As_2O_5 36·96, MnO 55·01, FeO trace, MgO 0·87, BaO 0·11, CaO 0·57, H_2O+ 5·86, H_2O- 0·04 = 99·42, agrees with the above formula. L. J. S.

Quensel (Percy) & Eckermann (Harry von). *Allodelphite, a new silico arsenite from Långban.* Geol. För. Förh. Stockholm, 1931, vol. 52 (for 1930), pp. 639–646.

Elongated tabular crystals of red-brown colour occur with manganophyllite and hausmannite along joints in dolomite. They are probably orthorhombic with $a : b : c = 0{\cdot}9402 : 1 : 1{\cdot}1067$, and the forms

a (100), *o* (102), *i* (120), *f* (111), *n* (126). Optically positive and very nearly uniaxial, with α 1·7244, γ 1·7493. Sp. gr. 3·573. Analysis by K. Almström gave I (As_2O_5 and MnO recalculated as As_2O_3 and Mn_2O_3) agreeing with $5RO.2R_2O_3.As_2O_3.SiO_2.5H_2O$. In its crystallographic and optical characters and X-ray powder photographs the new mineral shows a close relationship to synadelphite. A new analysis by R. Blix of synadelphite (sp. gr. 3·91) from Nordmark gave II, agreeing with $MnO.(Mn,As)_2O_3.2H_2O$. In conformity with this new formula for synadelphite, that of allodelphite may be written $MnO.(Mn_2, As_2, MnSi)O_3.H_2O$. The mineral is also related to schallerite, dixenite, and macgovernite [M.A. **4**–91].

	SiO_2.	As_2O_3.	Sb_2O_3.	Al_2O_3.	Fe_2O_3.	Mn_2O_3.	MnO.	MgO.	CaO.	H_2O.	Total.
I.	6·23	19·48	0·14	1·50	0·98	30·19	23·17	6·22	1·10	8·82	99·49
II.	—	27·92	—	—	—	36·61	23·53	—	—	11·33	100·25

I, also PbO 0·39, Na_2O 0·53, K_2O 0·74. II, also FeO 0·17, $CaCO_3$ 0·50, insol. 0·19.

L. J. S.

Lacroix (A.). *Les pegmatites de la syénite sodalitique de l'île Rouma (archipel de Los, Guinée française). Description d'un nouveau minéral (sérandite) qu'elles renferment.* Compt. Rend. Acad. Sci. Paris, 1931, vol. 192, pp. 189–194.

The pegmatites in the sodalite-syenite of Ruma contain in the interspaces between plates of microcline the following minerals: sodalite as large crystals, less abundantly nepheline, sometimes astrophyllite, arfvedsonite, eucolite, leucophane, fluorite, serandite, blende, molybdenite, aegirine; analcime and natrolite belonging to a later zeolitic phase; and lastly abundance of villiaumite (NaF), which acted as a 'mineralizer'. The eucolite is sometimes altered to catapleiite and by weathering to eudialyte. Some of these minerals show a brilliant fluorescence in ultra-violet rays: sodalite orange-yellow, catapleiite uranium-green, leucophane peach-blossom-red, fluorite violet, eucolite sometimes scarlet. The new mineral *serandite* forms peach-blossom-red monoclinic crystals elongated (up to 5 cm.) in the direction of the axis of symmetry, with cleavages (001) and (100) with angle 85° 30′ about. Sp. gr. 3·215. Optic axial plane and $Bx_a \perp (010)$, $a : c = -57°$, 2V 35° 30′, positive; indices variable, α 1·660, β 1·664, γ 1·688, $\gamma - \alpha$ 0·035. Analysis by Raoult, SiO_2 48·72, Al_2O_3 0·29, Fe_2O_3 0·03, FeO 1·33, MnO 28·99, MgO 0·06, CaO 10·42, Na_2O 7·38, K_2O 0·26, H_2O+ 2·67, H_2O- 0·11, total '100·46',

corresponds with $10SiO_2.7\frac{1}{2}(Mn,Ca)O.1\frac{1}{2}Na_2O.1H_2O$, i.e. an acid metasilicate near to pectolite, but differing from manganpectolite.

L. J. S.

Foshag (William F.). *Schairerite, a new mineral from Searles Lake, California.* Amer. Min., 1931, vol. 16, pp. 133–139, 5 figs.

This occurs as minute colourless crystals with gaylussite, tychite, pirssonite, hanksite, northupite &c. The crystals have the form of acute rhombohedra r $(10\bar{1}0)$, with smaller faces of c (0001), m $(10\bar{1}0)$, and e $(01\bar{1}2)$; $a : c = 1 : 2{\cdot}7634$. Sp. gr. 2·612, H. $3\frac{1}{2}$, ω 1·440, ϵ 1·445. Analysis gave SO_4 50·01, F 8·08, Cl 3·44, Na 35·77, K 0·13, $(Al,Fe)_2O_3$ 0·15, CaO 0·30, insol. 0·20, ign. 0·90 = 98·98, agreeing with $Na_2SO_4.Na(F,Cl)$. Artificial crystals of the pure fluoride prepared by J. F. Schairer are tabular on (0001) with $(02\bar{2}3)$ and $(10\bar{1}3)$, ω 1·436, ϵ 1·439.

L. J. S.

Ross (Clarence S.), Henderson (E. P.), Posnjak (E.). *Clarkeite; a new uranium mineral.* Amer. Min., 1931, vol. 16, pp. 114, 213–220, 1 fig.

The uraninite in pegmatite at Spruce Pine, North Carolina, is surrounded by a zone of dark-brown clarkeite, then orange-red gummite, and an outer zone of yellow uranophane. The clarkeite is massive with conchoidal fracture, waxy lustre, and yellowish-brown streak; H. 4–$4\frac{1}{2}$, sp. gr. 6·39; α 1·997, β 2·098, γ 2·108, 2V 30–50°, negative. Analyses I and II (I containing some admixed uraninite, and II some gummite) give the formula $RO.3UO_3.3H_2O$. Analysis III is of gummite; α 1·742, β 1·762, γ 1·776, 2V 60°, negative. X-ray powder photographs also show that clarkeite and gummite are distinct.

	UO_3.	Rare-earths.	Al_2O_3.	Fe_2O_3.	PbO.	MgO.	BaO.	CaO.
I.	81·72	2·62	0·92	0·18	3·71	0·28	nil	2·84
II.	82·76	1·12	0·50		3·70	—	0·04	1·10
III.	77·99	1·06	0·86	0·29	5·28	nil	2·16	0·90

	Na_2O.	K_2O.	SiO_2.	Insol.	H_2O.	Total.
I.	3·44	0·48	0·50	0·14	3·36	100·19
II.	2·61	1·42	0·30	1·20	5·22	99·97
III.	0·51	0·86	1·97	0·08	8·90	100·86

L. J. S.

Hess (Frank L.) & Henderson (E. P.). *Fervanite, a hydrous ferric vanadate.* Amer. Min., 1931, vol. 16, pp. 273–277, 1 fig.

Golden-brown fibrous material, suggestive of stained gypsum, occurs with the vanadium and uranium impregnations in sandstone

in Grant Co., Utah, and San Miguel Co., Colorado. It has α 2·186, β 2·222, γ 2·224, 2V very small, negative, extinction slightly inclined, and is probably monoclinic. Analysis on a small amount of material, after deducting 16 % gypsum and insoluble, agrees with the formula $2Fe_2O_3.2V_2O_5.5H_2O$. Analyses are quoted of an undetermined greenish-black mineral from Quisque, Peru, and of a brown-black mineral from San Miguel Co., Colorado, which suggest hydrous ferric vanadates (the second near $Fe_2O_3.4V_2O_5.9H_2O$) with less iron than the new mineral fervanite. L. J. S.

Beljankin (D. S.) [= Belyankin (D. S.)]. *Zur Mineralogie und Chemie eines Feldspatvertreters aus der „Wischnewy Gory" (Ural).* Centr. Min., Abt. A, 1931, pp. 190–196.

A sulphate-cancrinite like that of the Ilmen Mts. [M.A. **4**–379] has been found in a new felspar quarry in the Kurochkin valley, Wischnewy Gory [Vishnevy Mts.] at the northern end of the outcrop of miaskite rocks in southern Ural. It is light blue with good hexagonal prismatic cleavage, n 1·489, birefringence 0·0007, and shows at times a fine cross-hatched twinning. Analysis by E. V. Knipovich gave SiO_2 34·53, TiO_2 0·10, Al_2O_3 26·09, Fe_2O_3 0·56, FeO 0·11, MnO 0·09, MgO 0·09, CaO 1·48, Na_2O 16·51, K_2O 5·11, Cl 0·09, SO_3 5·02, CO_2 0·26, H_2O+ 5·35, H_2O- 1·36, total '100·02'. Deducting scolecite 8·6 % and gibbsite 2·4 % present as alteration products, this gives a formula $3Na_2Al_2Si_2O_8.Na_2SO_4.3H_2O$. In place of the name sulphate-cancrinite [or sulphatic cancrinite, M.A. **1**–256] the name *wischnewite* is suggested. The mineral belongs with davyne and cancrinite to the hexagonal group corresponding with the group of cubic minerals sodalite, nosean, and haüyne. L. J. S.

[Pilipenko (P. P.)] Пилипенко (П. П.). Микроструктура железотитанистых руд некоторых русских месторождений. [*Microstructure of titaniferous iron ores from some Russian occurrences.*] Минеральное Сырье [Mineral raw materials], Moskva, 1930, vol. 5, pp. 981–991.

Polished sections of ilmenite and titanomagnetite show in reflected light a complex micro-structure. The name 'silicoilmenite' is suggested for a red-brown mineral forming polysynthetic intergrowths with ilmenite from the Ilmen Mts., Ural. It also forms micropegmatitic intergrowths with microcline (?) and sphene. It is considered to be a solid solution of silicate or silica in ilmenite. No chemical analyses are given. P. N. C.

Iimori (Satoyasu), Yoshimura (Jun), & Hata (Shin). *A new radioactive mineral found in Japan.* Sci. Papers Inst. Physical and Chemical Research, Tokyo, 1931, vol. 15, pp. 83–88; Chem. News, London, 1931, vol. 142, pp. 209–211.

The name *nagatelite* is applied to a mineral closely allied to allanite occurring as black prisms (6 × 3 cm.) and lumps in pegmatite at Nagatejima, Ishikawa, Iwaki. The crystals are monoclinic with the forms *a* (100), *c* (001), *r* ($\bar{1}01$), *l* ($\bar{2}01$) and angles *ac* 64°, *ar* 123°, *al* 153°. The material has a resinous lustre and pale-brown streak, H. 5½, sp. gr. 3·91; optic axial plane (010), $Bx_a : c = 32°$, α 1·750, β 1·760, γ 1·765; pleochroism weak, α brownish-yellow, β reddish-brown, γ pale-yellow. It is decomposed by hydrochloric acid with separation of a white flocculent residue, and is fusible to a black magnetic globule which is readily decomposed by hydrochloric acid (thus differing from allanite). Analysis SiO_2 25·2, TiO_2 0·57, P_2O_5 6·48, Al_2O_3 14·3, Fe_2O_3 2·40, Ce_2O_3 14·58, La_2O_3 &c. 7·48, Yt_2O_3 &c. 4·51, ThO_2 0·88, FeO 7·29, MnO 1·12, CaO 10·4, MgO 1·04, H_2O+ 2·35, H_2O- 0·22, total 99·79, gives a formula $4R^{II}O.3R^{III}_2O_3.6(SiO_2, P_2O_5).2H_2O$, of the epidote type. The weak radioactivity of the mineral is due to the small amount of thorium. Associated minerals in the pegmatite are uraninite (sp. gr. 9·4) in small amount, octahedra of magnetite, biotite, &c. L. J. S.

Adam (H. R.). *Notes on platinum group minerals from Rustenburg and Potgietersrust districts, Transvaal.* Trans. Geol. Soc. South Africa, 1931, vol. 33 (for 1930), pp. 103–109, 2 pls.

A large part of the platinum in the concentrates from the norites is present as cooperite [M.A. 4–10, 149]. Like sperrylite, this is not attacked by aqua regia, but when heated in air at 700–800° C. it loses 15–20 %, against about 40 % lost by sperrylite. New analyses of material separated by treatment with aqua regia gave:

Locality.	Pt.	Pd.	S.	As.	Ni.	Insol.
Potgietersrust ...	71·5	6·4	14·1	3·4	2·0	1·5
Rustenburg ...	72·9	6·2	15·0	0·2	2·2	2·6

Goniometric measurements by G. V. White are given of a 1 mm. crystal of cooperite and are interpreted as orthorhombic [but clearly pyritohedral-cubic with the forms (100), (111), (210), and elongated along a cubic axis]; H. 5½, sp. gr. 9·0. Metallic platinum has the form of cubes, up to 1 mm., often elongated, and is strongly magnetic; analysis gave Pt 85·2, Pd 2·2, Fe 10·0, insol. (gangue, with

traces of Rh. Ir, &c.) 1·9. These cubes of platinum are sometimes plated with gold, and when treated with aqua regia they leave a hollow shell of cooperite. L. J. S.

Isobe (Hajime) & Watanabe (Tokunosuke). *A proposal to give the mineral name "Kanbaraite A and B" to Kanbara clay.* Rikwagaku-Kenkyū-Jo Ihō (Bull. Inst. Phys. & Chem. Research), 1930, vol. 9, pp. 440–445 [Japanese; English abstract in] Sci. Papers Inst. Phys. & Chem. Research, Tokyo, 1930, vol. 13, Abstracts pp. 40–41.

Natural Kanbara clay (kanbaraite A) has sp. gr. 2·67–2·917, $n>1·5148$ $<1·5200$, and on X-ray examination is found to be hexagonal. The composition is expressed as $[Al(SiO_4SiO_2)_3](AlMgH_4).H_2O(H_2O)_x$. It loses xH_2O below 200° C., $1H_2O$ between 600–800° C., and H_4 is expelled as water at the melting-point. The dehydrated material $[Al(SiO_4SiO_2)_3](AlMgH_4)$ (kanbaraite B) has n 1·509 and is cubic. L. J. S.

Jong (W. F. de). *Over goethiet, stainieriet, diaspoor en heterogeniet.* Natuurwetenschappelijk Tijdschrift, Antwerpen, 1930, vol. 12, pp. 69–72, 1 fig. (Flemish).

Schoep (Alfred). *Sur la stainierite et sur un nouveau gisement de ce minéral.* Ann. Service Mines, Katanga, 1930, vol. 1, pp. 55–58.

Later X-ray powder photographs of stainierite [M.A. **4**–347] indicate that it is not isomorphous with goethite, as previously suggested. The following data are given in the first paper:

	a.	*b*.	*c*.	*a* : *b* : *c*.	Mol. in unit cell.
Goethite ...	4·55	9·90	3·01 Å.	0·459 : 1 : 0·304	$Fe_4O_8H_4$
Diaspore ...	4·38	9·35	2·82	0·468 : 1 : 0·302	$Al_4O_8H_4$
Manganite ...	4·46	5·28	2·88	0·845 : 1 : 0·545	$Mn_2O_4H_2$

The results so far obtained are discussed in the second paper. The optical properties in reflected light suggest that stainierite is orthorhombic. Stainierite is recorded from a second locality, Kadjilangwe, Luambo. L. J. S.

Schoep (Alfred). *Over kristallen van juliëniet.* Natuurwetenschappelijk Tijdschrift, Antwerpen, 1931, vol. 13, pp. 147–149, 1 fig. (Flemish with French résumé).

Julienite [M.A. **4**–15] from Chamibumba, Katanga, is readily soluble in water and good crystals (2–3 mm.) are deposited on evaporation of the solution. These are tetragonal (not hexagonal),

with the forms a (100), m (110), p (111), and small k (940), l (530); $a : c = 1 : 1{\cdot}2059$. Sp. gr. 1·594; ω 1·556, ϵ 1·645. The chemical composition is not yet determined; chlorine and N_2O_5 are not present, as previously stated. L. J. S.

Spence (Hugh S.). *A remarkable occurrence of thucholite and oil in a pegmatite dike, Parry Sound district, Ontario.* Amer. Min., 1930, vol. 15, pp. 499–520, 13 figs.

A shattered zone across a pegmatite vein in the Besner felspar quarry, Henvey township, contains thucholite [M.A. 4–11] in association with allanite, pyrorthite (?), cyrtolite, sphene, uraninite, &c. The thucholite occurs as: (1) small nodules and veinlets with jet-black colour and brilliant conchoidal fracture, sp. gr. 1·57–1·67, containing moisture at 110° C. 1·60, volatile hydrocarbons (with probably some water) 19·96, fixed carbon 61·56, ash 16·63 = 99·75; (2) rough cubes with dull earthy appearance on the fracture, apparently pseudomorphous after uraninite, sp. gr. 1·61–2·00, containing moisture 2·00, volatile hydrocarbons 20·19, fixed carbon 50·82, ash 26·86 = 99·87. The ash is radioactive in both cases. In an adjoining fractured zone are traces of a viscous oil and pellets of elastic elaterite; the latter has sp. gr. 1·000–1·086, and contains C 81·48, H 11·46, ash 5·75 = 98·69. These carbonaceous minerals appear to be a later introduction into the pegmatite. L. J. S.

Faessler (A.). *Über die Zusammensetzung und das Alter des Thucholiths.* Centr. Min., Abt. A, 1931, pp. 10–18, 1 fig.

Thucholite [from Henvey, Ontario; preceding abstract] yielded 37·2 % ash, which, examined by the X-ray spectroscopic method, was found to contain U, Th, Pb, Cp, Yb, Er, Ho, Dy, Tb, Gd, Sm, Nd, Pr, Ce, La, Ru (?), Zr, Yt, Sr, As, Zn, Fe, V, Ca. From the intensities of the lines the amounts of the principal constituents are estimated at ThO_2 14·3, U_3O_8 1·65, Pb 0·2 %, from which an upper limit for the age of mineral is calculated as 250 million years. L. J. S.

Winchell (A. N.). *Maghemite or oxymagnite.* Amer. Min., 1931, vol. 16, pp. 270–271.

A discussion on the naming of magnetic ferric oxide [M.A. 4–214–5, 348]. The name 'maghemite' might suggest a deoxidized haematite. 'Oxymagnite' is suggested as a contraction of oxidized magnetite. L. J. S.

Instruments and Apparatus.

Bernal (J. D.). *A universal X-ray photogoniometer. Part II.* Journ. Sci. Instr. London, 1928, vol. 5, pp. 241–250, 281–290, 14 figs. *Part III.* Ibid., 1929, vol. 6, pp. 314–318, 2 figs. *Part IV.* Ibid., 1929, vol. 6, pp. 343–353, 4 figs. [Cf. M.A. **3**–514].

In Part II a detailed description of the instrument is followed by a discussion of the principles involved in its construction. The aperture system is first considered. It is necessary to find the dimensions of aperture and crystal which will give the maximum resolving power for a required photographic spot density. The problem is solved for two limiting cases, viz. the indefinitely small crystal or crystal with small absorption and the large crystal or crystal with high absorption. An approximate treatment of the size and shape of the spots to be expected under various conditions is also given. The author then proceeds to show how the correct alignment of the X-ray beam with respect to the crystal is obtained. A similar discussion follows for the spindle and crystal-holder, and lastly one on the arrangements for photographic registration.

Part III contains a detailed description of the instrument in its final form derived from an earlier model described in Part II. Part IV deals with the adjustment of the instrument and its uses, together with information on the selection and setting up of crystals. The four papers constitute primarily a description of a well-designed instrument; the research worker will also find practical details of X-ray methods new to the literature. F. A. B.

Wooster (W. A.). *A two-circle X-ray spectrometer.* Trans. Faraday Soc. London, 1929, vol. 25, pp. 401–402, 1 fig.

A two-circle instrument has the advantage that only one setting of the crystal is necessary, and it further enables direct measurements to be made of the layer-lines in the rotating crystal method. The vertical circle carries a combined ionization chamber and electrometer of the small Schonland pattern. L. J. S.

Kratky (O.). *Ein Röntgengoniometer für die Polykristalluntersuchung.* Zeits. Krist., 1930, vol, 72, pp. 529–540, 4 figs.

A modified Weissenberg X-ray goniometer in which the axis of the cylindrical film is coincident with the direction of the incident beam is designed to give the mutual orientation of the particles of a polycrystalline solid. Only one photograph is necessary for at least two

different sets of planes, but the accuracy of the method is limited by the breadth of the Debye-Scherrer lines. F. A. B.

Eulitz (Werner). *Ein Hilfsapparat zur Orientierung kleiner Kriställchen für röntgenographische Untersuchungen.* Zeits. Krist., 1929, vol. 70, pp. 506–507, 2 figs.

A piece of apparatus is described by means of which a crystal can be fastened on to a slide with any given face, however small, parallel to the plane of the slide; as is required in X-ray work, &c. H. H.

Mellis (Otto). *Ein bequemer Kreuztisch für Fedorow-Mikroskope.* Centr. Min., Abt. A, 1930, pp. 396–399, 2 figs.

Describes a miniature mechanical stage which can be fixed on to the inner ring of the Fedorov universal stage to enable the preparation to be moved laterally in two directions at right angles to one another. W. C. S.

Scheumann (K. H.). *Zwei Hilfsapparaturen für das petrographische Mikroskop.* Min. Petr. Mitt. (Tschermak), 1931, vol. 41, pp. 58–63, 180–187, 7 figs.

A refractometer combined with the microscope enables the refractive index of a liquid to be determined at the moment that it is matched with an immersed mineral grain. A modification of S. J. Shand's recording micrometer [M.A. **3**–175] enables six constituents in a rock-section to be registered. L. J. S.

Linck (G.) & Köhler (E.). *Skala zum Bestimmen der Brechungsexponenten von Flüssigkeiten mit dem Mikroskop.* Chem. der Erde, 1930, vol. 4, p. 458.

A set of eleven powdered glasses ranging in n from 1·5400 to 1·8052, also fluorite n 1·4339, is supplied for checking the values of the liquids used for the determination of the refractive indices of minerals by the immersion method under the microscope. L. J. S.

Ashton (F. W.) & Taylor (W. C.). *A precision method for measuring temperatures of refractive index liquids on a crystal refractometer and on a microscope slide.* Amer. Min., 1928, vol. 13, pp. 411–418, 3 figs.

A liquid of n 1·70 may show variations of 0·0006–0·0007 for each degree of temperature. The temperature of the liquid is not accurately given by a thermometer near the apparatus. Use is made of a differential thermocouple, with one junction in contact with the

protected bulb of a mercurial thermometer and the other flattened junction immersed in the liquid either on the refractometer or on the microscope slide. L. J. S.

Buerger (M. J.) & Huntsinger (H. A.). *A broad source of monochromatic light.* Amer. Min., 1929, vol. 14, pp. 329–331, 1 fig.
—— & Harrington (V. F.). *Ditto,* Ibid., 1930, vol. 15, pp. 579–580, 2 figs.

Salt is contained in a trough of platinum gauze in the broad flame of a Bunsen-burner. Various screens are suggested, so that observations can be made in a lighted room. L. J. S.

Pseudomorphs.

Ferrier (W. F.) & Graham (R. P. D.). *Pseudomorphs of corundum after spinel from Bathurst township, Lanark county, Ontario; with a note on the identification of the original locality of the spinel.* Trans. Roy. Soc. Canada, 1928, ser. 3, vol. 22, sect. 4, pp. 31–38, 1 pl.

Black octahedra of spinel, occurring in a band of crystalline limestone in granitic rocks, are partly or completely altered to a pale greenish mixture of corundum (61 %) and calcite (39 %), which form a graphic intergrowth. Other minerals present in the limestone are hornblende, tourmaline, magnetite, and well-formed crystals of corundum. This is the locality for spinel that was incorrectly recorded by T. S. Hunt in 1847 (and copied in the text-books) as 'Burgess.' L. J. S.

Hawkins (A. C.). *Halite and glauberite cavities and included minerals from central New Jersey.* Amer. Min., 1928, vol. 13, pp. 238–239.

Hawkins (Alfred C.). *Halite and glauberite cavities in the Triassic rocks of central New Jersey.* Amer. Journ. Sci., 1928, ser. 5, vol, 16, pp. 361–362.

Red Triassic shales near New Brunswick and elsewhere in New Jersey show hopper-shaped cavities after halite, and abundance of elongated diamond-shaped cavities after glauberite. The latter are sometimes lined or completely filled with calcite or baryte. [Cf. M.A. **1**–240–1.] L. J. S.

Brown (Levi S.). *The occurrence of leucoxene in some of the Permian mid-continental sediments.* Amer. Min., 1928, vol. 13, pp. 233–235.

Sandstone from Oklahoma treated with acids and heavy liquids yielded an abundant crop of leucoxene. This ranges from white to reddish-brown in colour and shows a great variety of forms. It may be derived from ilmenite or rutile or from intergrowths of these with magnetite and haematite. L. J. S.

Stark (M.). *Über Pseudomorphosen im Grünschiefer des Großglockner und über Formermittlung aus dem Gesteinsgewebe nicht herauslösbarer Komponenten.* Centr. Min., Abt. A, 1930, pp. 481–492, 2 figs.

Pebbles of green-schist collected in the Möll on the Carinthian side of the Gross-Glockner show white rhomb-shaped areas about 1 cm. across with a narrow zone of chlorite and a rim of albite. As they could not be isolated from the rock, a series of sections was cut and models reconstructed. The models show the form of plagioclase crystals tabular on (010). The material consists of clinozoisite with some mica. These pseudomorphs represent porphyritic crystals of plagioclase with a basic core and an acid margin in a diabase rock. L. J. S.

Kieslinger (Alois). *Paramorphosen von Disthen nach Andalusit.* Sitzungsber. Akad. Wiss. Wien, Math.-naturwiss Kl., Abt. I, 1927, vol. 136, pp. 71–78, 1 pl.

Rough prisms of andalusite with a coating of sericite from quartz veins in gneiss at Koralpe, Styria, have sp. gr. 3·554, and in microsections show an aggregate of needles and scales of kyanite. L. J. S.

Köhler (Eberhard). *Über die Entstehung von Schaumspat und Dolomit.* Chemie der Erde, 1931, vol. 6, pp. 257–268, 1 fig.

Analyses of Schaumspat (= aphrite) from the dolomitic limestones and marls (Zechstein and Muschelkalk) of several localities in Thuringia show that the material consists of calcium carbonate with only traces of magnesia and ferric oxide. It is a pseudomorph of aragonite after gypsum. It can be produced artificially by the action of magnesium hydrogen carbonate solution on gypsum at 20° C. under carbon dioxide pressure, or with calcium hydrogen carbonate at a higher temperature (30° C.). Attempts to prepare

dolomite by the action of magnesium sulphate solution on vaterite at various temperatures and pressures usually resulted in magnesite, but in the presence also of ammonium sulphate dolomite was formed. Dolomite-rock has been formed at certain depths in the earth's crust by the action of solutions of magnesium salts on limestone, and the calcium set free has been partly deposited as gypsum, which later became converted into aragonite, giving Schaumspat. L. J. S.

Perry (Elwyn L.). *Fibrous magnetite after chrysotile.* Amer. Journ. Sci., 1930, ser. 5, vol. 20, pp. 177–179, 1 fig.

Narrow veins of magnetite occur in serpentine on Casper Mtn., Wyoming. In some veins the material is wholly granular, while in others it is granular in the centre and bordered by fibrous magnetite. The latter is evidently a replacement of chrysotile. Granular magnetite in the body of the serpentine is regarded as an original constituent of the dunite from which the serpentine was derived, while the vein magnetite was probably introduced from a granitic magma intruded into the serpentine. L. J. S.

Van Horn (Frank R.). *Replacement of wolframite by scheelite with observations on the fluorescence of certain tungsten minerals.* Amer. Min., 1930, vol. 15, pp. 461–469, 2 figs.

A specimen from East Pool mine, Camborne, Cornwall, shows pink scheelite partly or wholly replacing wolframite, the alteration proceeding along cracks at right angles to the cleavage. Associated minerals are quartz, mispickel, pyrrhotine, chalcopyrite, fluorite, chlorite, and cassiterite. Exposed to ultra-violet rays (from an iron arc) scheelites from most localities show a bright light-blue fluorescence, due perhaps to the presence of rare-earths. A few wolframites show the same fluorescence, due perhaps to the presence of secondary scheelite. L. J. S.

Rock-forming Minerals and Petrology.

Fenner (Clarence N.). *The crystallization of basalts.* Amer. Journ. Sci., 1929, ser. 5, vol. 18, pp. 225–253.

The author is convinced that 'processes of some kind in addition to crystallization play an essential part in differentiation'. The crystallization of solid solutions, which explains the concentration during the crystallization of basaltic magma of a residue rich in alkali-felspars, must also imply an increase in concentration of iron

compounds due to crystallization of the pyroxenes. Published analyses are quoted to show that such concentration does occur in the liquid remaining after crystallization of early-formed pyroxenes (Vesuvius and Etna), olivines (Hawaii), and in two sills of basic rocks where there has plainly been gravitative separation—Electric Peak and the 'Palisades' (New Jersey). The frequent occurrence in surface basalts of mesostasis of brown glass with magnetite crystals of late formation is further evidence that the concentration indicated by the theory does occur, and for these surface basalts crystallization is probably the only important factor in differentiation. If abyssal magmas have differentiated in another direction other factors must have come into play. Among these other factors gaseous transfer may play a part. Interstitial patches of quartz and felspar in dolerites have been considered to represent the last crystallizing residue of the dolerite magmas. They may, however, be due to the action of late hydrothermal solutions. The association of brown mica with late-formed magnetite is probably another effect of the retention of water and fluorine in the residual liquid, while the contact metamorphism produced by some dolerites and basalts in New Jersey and elsewhere also indicates the presence of a considerable quantity of volatile constituents. W. C. S.

Barth (Tom. F. W.). *Mineralogical petrography of Pacific lavas. Part I. Minerals.* Amer. Journ. Sci., 1931, ser. 5, vol. 21, pp. 377–405, 7 figs. *Part II. Rocks.* Ibid., pp. 491–529, 1 fig.

A review of occurrence and properties of the minerals in lavas of the islands of the Pacific Ocean compiled from published papers, and the results of study of fresh material by the author. The minerals of greatest importance are the olivines, pyroxenes, and felspars. The pyroxenes range from diopsidic augites to pigeonites (i.e. pyroxenes rich in clinoenstatite or clinohypersthene). An interstitial mineral resembling an alkali-felspar but optically positive seems to correspond in composition to a mixture of alkali-felspar and nepheline (? anemousite) [M.A. **4**–398]. Its refractive index is between 1·53 and 1·55. It may be the same as the felspar described by A. Lacroix in a tahitite from Tahiti as 'isorthose' (optically positive orthoclase).

The second part of the paper describes the mineral composition of sixty lavas including those studied by H. S. Washington from the

Sandwich Islands [M.A. **4**–131] and many recently analysed by Mary G. Keyes from the Marquesas. Modes calculated from the analyses are based on micrometric measurements of the proportions of minerals and the knowledge of their composition arrived at in Part I. An example of the calculations is given. S. J. Shand's classification is adopted and his nomenclature is used, but in the alkaline division a new group, the 'pacificites' is set up for the anemousite-bearing basalts [M.A. **4** 398]. The adoption of Shand's classification leads to the inclusion among 'phonolites' of a nephelitic basalt, a trachyte containing analcime, and a trachyte with 2·8 % normative nepheline. The author adopts the term 'picrite' for two picrite-basalts (in the sense of Washington) from the Marquesas—an extension of the term authorized neither by Rosenbusch nor by Shand. No macroscopic descriptions of the rocks are given. There is a useful index of mineral and rock names at the end of the paper. W. C. S.

Ödman (Olof H.). *Volcanic rocks of Mt. Elgon in British East Africa.* Geol. För. Förh. Stockholm, 1930, vol. 52, pp. 455–537, 2 pls. (maps), 32 text-figs.

The author describes the topography and petrography of Mount Elgon, which is proved definitely to be a volcano of the central type with a caldera between 7 and 8 km. in diameter. The lavas and tuffs, whose present extension and distribution is shown on two maps, are found to belong to three different series designated in order of their extrusion, the nephelinitic stage, the 'basaltic' stage, and the phonolitic stage. The last includes phonolitic nephelinites of the caldera rim, phonolitic nepheline-basalts of the caldera, and phonolites of Gortex and Riwa Hill. Agglomerates and tuffs are associated with the lavas of all three series, and dikes of bergalite are found cutting the phonolitic nephelinites of the caldera rim and probably represent the latest product of the volcano. The earliest lavas are nephelinites, many of them melilite-bearing. The lavas of the 'basaltic' stage are nepheline-basalts, melilite-basalts, and nepheline-melilite-basalts. Refractive indices determined on polished plates of nepheline from two of the nephelinites are: (1) ω 1·5455, ϵ 1·5402, (2) ω 1·549, ϵ 1·544. Some of them show zoning due to alternating shells of different refractive index. Bulk analyses of the rocks indicate that the $KAlSiO_4$-molecule is present. Diopside, near aegirine-augite, in a nepheline-melilite-basalt gave α 1·6859,

β 1·6923, γ 1·7135, 2Vγ average 65°, $\gamma : c = 44$–51°. Olivine in two rocks of the 'basaltic' series: (1) α 1·6617, β 1·6787, γ 1·6989, (2) α 1·6579, β 1·6749, γ 1·6941, 2Vγ (average of 15 crystals) 85°. Some of the olivines have a thin outer zone with 2V 70° negative, which is thought to be monticellite. Melilite in most of the lavas shows optical characters normal for melilite and is negative. Peg-structure is rarely observed. In some lavas it shows unusually high birefringence up to 0·016, ω being 1·642. N. Sahlbom contributes five new chemical analyses of the rocks which are used in the construction of differentiation diagrams. W. C. S.

Smith (Walter Campbell). *A classification of some rhyolites, trachytes, and phonolites from part of Kenya Colony, with a note on some associated basaltic rocks.* Quart. Journ. Geol. Soc. London, 1931, vol. 87, pp. 212–258, 2 pls.

Rocks collected by J. W. Gregory from Kenya Colony in 1893 were described by Gregory and G. T. Prior, and those collected by him in 1919 were described by Miss A. T. Neilson. The nomenclature became very confused and in this paper the author attempts to clear it up. For each rock name adopted all names used by previous authors are listed. An attempt has been made to tabulate and condense petrographical descriptions. Sixteen new chemical analyses are given. The rhyolitic and trachytic lavas show close comparisons with those of Pantelleria. An interesting discovery is that of large phenocrysts of nepheline in all the typical kenytes of Mt. Kenya collected and named by Gregory. It has a low refractive index, ω about 1·535, ϵ about 1·531. X-ray Laue photographs taken by F. A. Bannister of a phenocryst in a thin microscope-section confirmed the identity of the nepheline, and incidentally demonstrated a new application of X-ray methods to petrography.

W. C. S.

Szentpétery (Zsigmond). *Szarvaskő vidékének oligoklászkőzetei.*—Szentpétery (S. v.). *Oligoklasgesteine der Gegend von Szarvaskő.* Mat. Term.-tud. Értesítő, Budapest, 1930, vol. 47, pp. 432–465 (Hung.), pp. 466–467 (Germ. summary), 3 pls., 5 text-figs.

Petrographical descriptions with seven chemical analyses are given of the oligoclase-rocks (oligoclasites, oligoclase-aplite, and oligoclase-pegmatite) occurring as dikes and schlieren in the gabbroidal mass at Szarvaskő, Bükk Mts., com. Heves, Hungary [M.A. **4**–401]. They have been produced by magmatic differentiation from the gabbroidal

magma. The main constituent is felspar (70–80 %), namely oligoclase (Ab_{85}–Ab_{66}) with only little albite or andesine. Titanomagnetite and ilmenite are always present, with little biotite, and rarely augite and amphibole. Rarer, but characteristic, are tourmaline, fluorite, and calcite. The analyses show much Na_2O (6·01–9·12 %), very little K_2O (trace–0·75), and appreciable amounts of TiO_2 (0·21–2·04) and iron oxides (FeO 0·52–7·93, Fe_2O_3 0·26–3·52); SiO_2 56·71–65·20 %. V. Z.

Harada (Zyunpei). *'Sara-isi' or dish-stone of the volcano Aso.* Proc. Imp. Acad. Japan, Tokyo., 1927, vol. 3, pp. 539–542, 5 figs.

Flat, dish-like, pieces of lava, 2 to 10 cm. across with a raised rim round the edges are found around the crater of Nakadake, a central cone of Aso, Kiushiu, Japan. They consist of ejected fragments of earlier volcanic rocks coated during an eruption with molten glassy lava and ash and thrown out to fall upon the surface of the ash-field of the volcano. The impact is responsible for the compact smooth lower surface and the upward-projecting rim. W. C. S.

Fersmann (A.) [= Fersman (A. E.)]. *Über die geochemisch-genetische Klassifikation der Granitpegmatite.* Min. Petr. Mitt. (Tschermak), 1931, vol. 41, pp. 64–83.

— *Zur Geochemie der Granitpegmatite.* Ibid., 1931, vol. 41, pp. 200–213.

A repetition of previous papers [M.A. **2**–399, **3**–84] with further elaboration of the schematic tables. L. J. S.

[Nemova (Z. N.) & Levinson-Lessing (F. Y.)] Немова (З. Н.) . . . Левинсон-Лессинг (Ф. Ю.). Сборник анализов Русских изверженных и метаморфических горных пород. Compilé par Z. Némova et rédigé par F. Loewinson-Lessing. *Recueil d'analyses chimiques des roches éruptives et métamorphiques russes.* Труд. Геол. Ком. (Mém. Com. Géol.), Moskva & Leningrad, 1930, n., ser. no. 186, 361 pp. Price 12 rub.

This is a collection from the literature of 1676 chemical analyses of igneous and metamorphic rocks from European and Asiatic Russia, including many from Finland and some from the Baltic States. It is on much the same plan as H. S. Washington's tables [M.A. **1**–55]. The Levinson-Lessing and Osann ratios have been calculated for each analysis. The names of the rocks are given in both Russian and French. L. J. S.

Phillips (F. Coles). *An association of anthophyllite and enstatite.* Geol. Mag. London, 1930, vol. 67, pp. 513–516, 2 figs.

Describes slides cut from anthophyllite from [Hillswick, Mainland] Shetland Islands, in which pyroxene is extensively developed. The pyroxene is colourless and is all enstatite. Monoclinic pyroxenes were looked for and not found. The anthophyllite showed the usual optical orientation, with γ 1·64 and 2V 79–84° negative. Some of the slides used were from the material described and analysed by M. F. Heddle in 1880. W. C. S.

Marcet i Riba (Jaume). *Les lleis de macla dels feldespats de vàries roques de Camarena, Bagur, Ferragut, i Eivissa, determinades pels mètodes universals de Fedorow.* Bull. Inst. Catalana Hist. Nat., 1923, ser. 2, vol. 3, pp. 166–187, 6 pls., 9 text-figs.

Gives the data obtained in determinations by the Fedorov method of albite, orthoclase, and microcline from the diabases of Camarena (Teruel), albite and anorthoclase from the camptonites of Eivissa (= Ibiza), orthoclase and andesine-labradorite from the teschenites of Ferragut (Mahon), labradorite-bytownite from the camptonites of Bagur (Gerona). Some of the results are plotted in five stereographic projections, printed in colour. Values of birefringence and 2V for some of the same felspars are published in another paper [M.A. **4**–282]. W. C. S.

Marcet i Riba (Jaume). *Les dades cristal·logràfiques assolides pels mètodes universals de Fedorow.* Bull. Inst. Catalana Hist. Nat., 1925, ser. 2, vol. 5, pp. 54–59.

A brief appreciation of the Fedorov method for felspar determination. W. C. S.

Mügge (O.). *Über die Lage des rhombischen Schnittes im Anorthit und seine Benutzung als geologisches Thermometer.* Zeits. Krist., 1930, vol. 75, pp. 337–344.

The position of the rhombic section was accurately measured for a large number of pericline twins of anorthite from Mt. Vesuvius, Italy, collected by Sartorius von Waltershausen. The angle σ between the trace of the rhombic section on (010) and the edge (010) : (001) was found to be from 2–4° lower than was to be expected for a composition corresponding to the measured densities for these crystals. The author also finds that the σ values for twin-lamellae artificially produced by strain at room-temperatures are higher by about 4° than the σ values for the natural lamellae in the

same crystal. It is suggested that the position of the rhombic section depends on temperature of formation as well as chemical composition, σ being lower for high temperatures. Beckenkamp's observations (1881) on the change of the axial angles α, β, and γ for anorthite for the range 20–200° C. yield calculated values of σ which, however, appear to increase with rise of temperature. The author discusses the use of the rhombic section as a geological thermometer. [No chemical data are given for the material studied and the possibility of variations in composition of crystals from the same matrix is not considered.] F. A. B.

Angel (Franz). *Pigmentierte Apatite aus Intrusivgesteinen der Schladminger Tauern (Preintaler Hütte und Kotalpe).* Centr. Min., Abt. A, 1930, pp. 371–375, 5 figs.

Apatite showing dark-coloured, weakly pleochroic cores are common in a schistose tonalite from Schladming, Styria. The minute rods which form the cores are believed to be ilmenite. The concentration of 'ores' seems to have been high, as 'sagenite' occurs frequently included in hornblende in the same rock. The figures resemble some of those given by A. W. Groves and A. E. Mourant (Min. Mag., **22**–95). W. C. S.

Herre (Rudolf). *Petrographische und chemische Untersuchung junger Eruptivgesteine in der Umgebung von Oberwiesenthal im Erzgebirge.* Chemie der Erde, 1930, vol. 4, pp. 632–665, 22 figs.

The rocks of this area on the Saxony side of the Erzgebirge consist of basaltoid nephelinites with cognate inclusions, with haüynite, tephrite, leucitite, and leucite-basalt, and phonolites of several types, some haüyne-bearing. Descriptions are given of eighteen rocks which have been analysed; the Niggli values are calculated and discussed. The rocks fall into eight magma-types, three of which belong to the 'Atlantic' and five to the 'Mediterranean' 'Sippe'. Comparison is made with the magma province of the Kaiserstuhl, Baden. Perovskite occurs as crystals several millimetres across in the ijolitic inclusions of the nephelinite. W. C. S.

Osborne (G. D.). *The contact metamorphism and related phenomena in the neighbourhood of Marulan, New South Wales. Part I: The quartz-monzonite–limestone contact.* Geol. Mag. London, 1931, vol. 68, pp. 289–314, 1 pl., 1 text-fig.

The rocks of the contact-zone are marble, hornfels, skarn, and hybrid diopside-bearing rocks. The last are due to limited marginal

assimilation of limestone by quartz-monzonite, compared with which they show a slightly more basic plagioclase, a relative abundance of sphene, and a lime-rich diopside in place of hornblende and biotite. The quartz-monzonite carries no pyroxene and has previously been described by W. G. Woolnough as granodiorite. The minerals of the contact-rocks are described. Wollastonite, $\alpha : c = 32°$, α' 1·618, γ' 1·632 (by the immersion method), D_4^{15} 2·841. Idocrase, zoned crystals of varying optic sign, pleochroic in thick sections, ω pale greyish-green, ϵ pale wine-red, n 1·724–1·730, D_4^{15} 3·360. Diopside, in the hybrid rocks, $\gamma : c = 38–43°$, α' 1·699, γ' 1·725. Hedenbergite, in the skarns, $\gamma : c = 42–48°$, opt. +, α' 1·720–1·722, γ' 1·736–1·739; pleochroism, α palest greyish-green, β greyish-green, γ fairly strong bluish-green. Grossular, n 1·749–1·753, D_4^{17} 3·689. Andradite, in the skarns D_4^{18} 3·82. The presence of the silicate minerals in the hornfelses is attributed to impurities in the limestone beds, and it is considered that the only evidence of transfer of magmatic material is that of fluorine probably present in the idocrase and phlogopite.

W. C. S.

Seifert (H.). *Geologische Thermometer.* Fortschritte Min. Krist. Petr., 1930, vol. 14, pp. 167–291, 19 figs.

The direct observation of temperature in molten volcanic rocks is attended with danger, and such records are few in number. Eutectic mixtures and the phase-rule might supply an indirect method of determining temperature, but the necessary conditions do not occur frequently in nature. More promising is the existence of two modifications of a substance one of which is formed above a certain temperature and the other below, such as α-quartz and α-tridymite, wollastonite and pseudowollastonite, nepheline and carnegieite, and many others. Similar use might be made of the decomposition of iron oxide or the decolorization of rose-quartz above a certain temperature, and so on. But the phenomena depend so much on unknown conditions of pressure, &c., that the author feels doubtful about the accuracy of all such indications of temperature in the present state of knowledge.

H. H.

Hevesy (George von). *The chemistry and geochemistry of the titanium group.* (Hugo Müller Lecture.) Journ. Chem. Soc. London, 1931, pp. 1–16, 3 figs.

In order to arrive at the relative abundance of elements of the titanium group in the earth, the following analysis was made of an

average sample of 300 igneous rocks of all kinds: SiO_2 56·35, TiO_2 1·02 (=Ti 0·61 %), Al_2O_3 13·08, Fe_2O_3 2·87, FeO 4·64, MnO 0·11, MgO 8·06, CaO 5·70, Na_2O 3·19, K_2O 3·26, P_2O_5 0·21, H_2O+ 1·56, H_2O- 0·06, also Zr 0·019, Hf 0·00032, Th 0·0013, V 0·002, Nb 0·000032, Ta 0·000024 %. The average amount of titanium in twenty stony meteorites was Ti 0·19 %, and in eleven meteoric irons 0·04 %. The titanium content of the whole earth, including an eclogite shell and an iron core, is placed at 0·15 %, and it is concluded that this titanium is present largely as ilmenite. The other members of the group, zirconium, hafnium, and thorium, have larger atomic dimensions, and occur mainly as concentrations in residual magmas represented by pegmatites. L. J. S.

Laudermilk (J. D.). *On the origin of desert varnish.* Amer. Journ. Sci., 1931, ser. 5, vol. 21, pp. 51–66, 14 figs.

A review is given of the literature on the dark brown and black coatings on rocks [M.A. **1**–399], and material is described on the outcrops and blocks of rhyolite from Mojave desert, California. Analysis of the coating shows SiO_2 90 %, with Fe_2O_3 2·40 and MnO 4·46 %. The dendritic markings are due to a lichen which secretes manganese and iron. L. J. S.

Miscellaneous.

Orlov (Alexandr). *Wavellit od Černovic u Tábora a jeho paragenese.* [Wavellite from Černovice near Tábor and its paragenesis.] Rozpravy Ceske Akad., 1929, vol. 39, no. 38, 41 pp., 1 pl., 2 text-figs. [Czech with French résumé.]

Orlov (Alexander). *Wavellit von Černovic bei Tábor (Böhmen) und die erdigen Phosphate aus seiner Paragenese.* Zeits. Krist., 1931, vol. 77, pp. 317–336, 2 figs.

Deep-blue wavellite occurs as small spherules in crevices in a quartzite containing fuchsite and much graphite in the gneisses north of Černovice in SE. Bohemia. It shows four distinct cleavages (010), (110), (101), and (100); α 1·535, β 1·543, γ 1·5605, 2V 70° about; pleochroism, α blue, β brownish-yellow, γ pale brownish. Analysis gave P_2O_5 32·72, Al_2O_3 31·01, Cr_2O_3 0·52, Fe_2O_3 3·18, FeO 2·63, CuO 0·06, MgO 0·32, CaO 0·68, SiO_2 0·96, F 0·60, H_2O+ 26·33, H_2O(105°) 1·59, total (less O for F) 100·35; sp. gr. 2·358. The mineral is readily soluble in H_2SO_4 or NaOH, but only difficultly in HCl or HNO_3. Water 17·49 % is lost between 105° and 150° C. with

rapid decrease of γ to 1·48; most is lost by 600°, and all at 1100° yielding an isotropic residue with n 1·470. The dehydration curve shows analogies with the zeolites. Associated with the blue wavellite are earthy crusts of basic phosphates of aluminium, ferric iron, and calcium, with halloysite, kaolin, and quartz crystals. Optical determinations made on other material for comparison include: white wavellite from Třenice γ 1·552, greenish-yellow from Langenstriegis 1·555 and 1·556, deep-green from Clonmel 1·560, grass-green from Langenstriegis 1·580 (these being higher values than previously recorded); foucherite from Svatá Dobrotivá n 1·61–1·64, from Třenice 1·67; zepharovichite from Třenice n 1·562; fischerite = uhligite from Roman Gladna n 1·57–1·58; coeruleolactite from Steamboat, Pennsylvania n 1·572 $\perp$ elongation, n 1·582 $\parallel$ elongation. F. S.

Orlov (Alexandr). *Hadec od Mladotic u Ronova nad Doubravkou.* [Serpentine from Mladotice near Ronov on the Doubravka.] Sborník Státního Geol. Ústavu Československé Republiky, 1930, vol. 9, pp. 83–103, French résumé pp. 104–107, 1 pl., 3 text-figs.

Anthophyllite is frequent as a secondary mineral in the serpentine at this locality. It is replaced partly by fibrous talc, and partly by a fibrous mineral agreeing optically with serpentine but containing only about 3 % H_2O. The latter also occurs as an alteration product of tremolite. The secondary chlorites also show considerable variation in their optical characters; those in fissures are richer in iron than those in the serpentine itself. The serpentine-rock shows negative elongation and belongs to the α-serpentine variety of H. Tertsch [M.A. **2**–438]. F. S.

Nováček (Radim). *Granát z Maršíkova u Sobotína.* [Garnet from Maršíkov near Sobotín.] Časopis Moravského Zemského Musea, 1930, vol. 27, pp.

—— *Kontaktní granát z Bludova na severní Moravě.* [Contact garnet from Bludov in northern Moravia.] Příroda, Brno, 1930, vol. 23, pp. 400–402.

Analyses of garnet from: I, the chrysoberyl locality at Maršíkov = Maršová = Marschendorf; II, contact-metamorphic limestone at Bludov. The refractive indices of I, an almandine-spessartine, are n_{Li} 1·8102, n_{Na} 1·8165, n_{Tl} 1·8207; sp. gr. 4·219. II is clouded with incipient decomposition; sp. gr. 3·63; and pseudomorphs of scapolite after garnet are found at this locality.

	SiO_2.	TiO_2.	Al_2O_3.	Fe_2O_3.	FeO.	MnO.	MgO.	CaO.	H_2O.	Total.
I.	36·59	trace	21·07	2·83	13·07	25·75	0·84	0·48	—	100·63
II.	37·54	1·04	14·32	10·58	0·76	0·30	0·30	34·83	0·13	99·80

F. S.

Nováček (Radim). *Linneit z dolu Prago u Kladna.* [Linnaeite from the Prago mine near Kladno.] Rozpravy České Akad., 1930, vol. 40, no. 37, 7 pp., 1 pl., 3 text-figs.

Small crystals of linnaeite, associated with millerite, chalcopyrite, ankerite, baryte, and nacrite, occur in cavities in the Carboniferous clay-ironstone (pelosiderite). They show the forms (111), (100), and icositetrahedral faces near (722) and (522), and are often elongated in the direction of a diad axis. When they are penetrated by needles of millerite this diad axis is parallel to the *c*-axis of the millerite. Micro-chemical analyses on less than 20 mg. gave Ni 31·59, Co 23·60, Fe 3·32, Cu 2·04, S 40·04 = 100·59, agreeing approximately with R_3S_4. [This occurrence is very similar to that in South Wales, M.A. 4–84.] F. S.

Kokta (Jaroslav). *O některých fysikálně-chemických vlastnostech opálů a jejich vztahu k uměle připraveným amorfním kyselinám křemičitým.* [On some physico-chemical properties of opals and their relation to artificially prepared amorphous silicic acids.] Rozpravy České Akad., 1930, vol. 40, no. 21, 26 pp., 9 figs.

The following determinations were made on opals of which the homogeneity had been proved by microscopical examination:

	H_2O %.	n_{Na}.	Sp. gr.
1. Semi-precious, Dubník, Slovakia	6·33	1·4531	2·096
2. Glassy ,, ,, ...	8·97	1·4465	2·036
3. Hyalite, Tateyama, Japan	4·71	1·4567	2·139
4. ,, Valeč, Bohemia	3·55	1·4592	2·160
5. Fire-opal, Zimapan, Mexico	9·16	1·4410	2·008
6. Green, Martinice, Moravia	7·40	1·4445	2·038
7. Milk-opal, Smrček, Moravia	7·05	1·4491	2·074
8. ,, ,, ,, ...	5·36	1·4528	2·046
9. ,, ,, ,, ...	6·27	1·4499	2·075
10. ,, ,, ,, ...	5·30	1·4525	2·116
11. ,, ,, ,, ...	5·36	1·4518	2 098
12. ,, ,, ,, ...	6·05	1·4499	2·056
13. ,, ,, ,, ...	6·17	1·4478	2·070
14. ,, ,, ,, ...	5·58	1·4496	2·055
15. ,, ,, ,, ...	5·25	1·4501	2·122
16. ,, ,, ,, ...	4·76	1·4512	2·104
17. ,, Strážek, Moravia	5·08	1·4520	2·100
18. ,, Mohelno, Moravia	8·36	1·4425	2·025
Artificial silica gels	0·96	—	2·2609
	28·04	1·4090	1·7310
	96·73	1·3351	1·0164
	97·915	1·3344	1·0091

These data when plotted show a linear relation between the amount of water and both the refractive index and the sp. gr., especially in the case of the purer opals (nos. 1–4); the other less pure opals (except nos. 8, 9, 11) approximate to another line which lies between the first and the line joining the data for water and silica-glass. By extrapolation dehydrated opal and silica gel would have a higher refractive index than silica-glass. F. S.

Novák (Jiří). *Krystaly kalcitu z karbonu pánve rosicko-oslavanské.* [Calcite crystals from the Carboniferous formation of the Rosice-Oslavany basin.] Zprávy Komise na Přírodovědecký Výzkum Moravy a Slezska, Oddělení Mineralogické, Brno, 1931, no. 5, 21 pp., German résumé 10 pp., 4 pls.

Calcite crystals rich in forms and of various habits are found in cavities in the clay-ironstones. Five habits are distinguished and forty forms noted, including new forms (19.4.$\bar{2}\bar{3}$.15) and (5.0.$\bar{5}$.26). The forms are discussed statistically and the surface characters and light-figures studied in detail. A list is given of the crystal-forms for calcite known from Moravia and Czech Silesia. F. S.

Franzenau (Ágoston) †[1856–1919] & Vendl (Mária). *Újabb adatok a magyarországi kalcitok ismeretéhez.*—Franzenau (August) & Vendl (Maria). *Neuere Daten zur Kenntnis der ungarischen Calcite.* Mat. Term.-tud. Értesítő, Budapest, 1930, vol. 47, pp. 1–19 (Hung.), pp. 20–21 (Germ. summary), 16 figs.

Crystallographic data are given for calcite from 15 Hungarian localities, from some of which crystals have not previously been described. 52 crystal-forms are noted of which the following 14 are new: (21.0.$\bar{2}\bar{1}$.1), (2.27.$\bar{2}\bar{9}$.14), (2.13.$\bar{1}\bar{5}$.7), (27.14.$\bar{4}\bar{1}$.13), (23.7.$\bar{3}\bar{0}$.4), (6.13.$\bar{1}\bar{9}$.8), (28.12.$\bar{4}\bar{0}$.5), (1.9.$\bar{1}\bar{0}$.19), (1.18.$\bar{1}\bar{9}$.37), (9.24.$\bar{3}\bar{3}$.10), (1.7.$\bar{8}$.15), (8.3.$\bar{1}\bar{1}$.2), (3.10.$\bar{1}\bar{3}$.8), (2.10.$\bar{1}\bar{2}$.1) = (53$\bar{7}$). Crystals from Blezsény show an acute scalenohedron grown in parallel position on the two polar ends of a rhombohedron. V. Z.

Franzenau (Ágoston) †[1856–1919] & Tokody (László). *Binnentali pirit és barit.—Pyrit und Baryt von Binnental.* Mat. Term.-tud. Értesítő, Budapest, 1930, vol. 47, pp. 553–565 (Hung.), pp. 566–568 (Germ. summary), 13 figs.

Franzenau (A.)† & Tokody (L). *Über den Pyrit und Baryt vom Binnental.* Schweiz. Min. Petr. Mitt., 1931, vol. 11, pp. 67–75, 13 figs.

Small crystals of pyrite from the crystalline dolomite of the Binnenthal, Switzerland, showed 17 forms including new (17.9.1),

(13.8.3), (19.12.5). Small water-clear crystals of baryte show 18 forms. V. Z.

Tokody (László). *Chalkopirit Ó-Radnáról.—Über den Chalkopyrit von Ó-Radna.* Mat. Term.-tud. Értesítő, Budapest, 1930, vol. 47, pp. 237–241 (Hung.), p. 242 (Germ. summary), 1 fig.

Pseudo-cubic crystals (2–15 mm.) of chalcopyrite resembling rhombic-dodecahedron, with the forms *m e* [Dana's letters]. [Cf. Min. Mag. **13**–190.] V. Z.

Vendl (Mária). *Újabb vizsgálatok krassószörénymegyei kalcitokon.* Vendl (Maria). *Neuere Untersuchungen an Kalziten aus dem Komitat Krassószörény.* Mat. Term.-tud. Értesítő, Budapest, 1930, vol. 47, pp. 97–108 (Hung.), p. 109 (Germ. summary), 16 figs.

Vendl (Marie). *Neuere Untersuchungen an Calciten aus dem Komitat Krassószörény.* Centr. Min., Abt. A, 1930, pp. 349–360, 16 figs.

Further examination of calcite crystals from Vaskő, Szászkabánya, and Oravicabánya [M.A. **3**–362, 460]. Most of crystals from Theresia mine, Vaskő, are twinned on (0001); forms *c m r e f χ d* [Dana's letters], 𝔤 (0.16.$\bar{1}$6.5), 𝔪: (4.14.$\bar{1}$8.5), *u*: (3.5.$\bar{8}$.22), 𝔥 (4.9.$\bar{1}$3.5), 𝔮 (2.10.$\bar{1}$2.3), the last three being new. Twins on (0001) from Szászkabánya show *m r M f d v*, *D* (3.8.$\bar{1}\bar{1}$.4), *F*: (4.28.$\bar{3}\bar{2}$.15), *O* (8.24.$\bar{3}\bar{2}$.11), the last two being new. Prismatic crystals from Oravicabánya show interesting parallel growths. V. Z.

[Padurova (O. G.)] Падурова (О. Г.). Кристаллы сперрилита из Тимптонского и Зейского золотоносных районов.—Padurova (O.). *Die Kristalle von Sperrylit aus dem Gebiete von Timpton und Zeja.* Зап. Росс. Мин. Общ. (Mém. Soc. Russ. Min.), 1930, ser. 2, vol. 59, pp. 181–185, 4 figs. [Russ. with Germ. summary, p. 185.]

Measurements were made on small (0·5–1·0 mm.) crystals of sperrylite from the gold washings in prov. Amur, eastern Siberia [M.A. **2**–138]. Those from the Timpton river are cubic in habit with the forms (100), (111), (710), (310), (210), (110), (230), (250), (331), (776), (322). On those from the Zeya river the octahedron predominates with (111), (100), (310), (110), (10.5.2). Crystals from the Vermilion mine, Sudbury, Ontario, were found to be too small for goniometric measurement. L. J. S.

Rodolico (Francesco). *Osservazioni cristallografiche sull'ilvaite.* Periodico Min. Roma, 1931, vol. 2, pp. 122–132, 4 figs.

Crystals of ilvaite from Campiglia, Toscana, showed the forms *m s r n e o i* [Dana's letters] and new λ(212), δ(213), and gave axial ratios $a : b : c = 0{\cdot}6623 : 1 : 0{\cdot}4358$. Analysis gave SiO_2 29·29, TiO_2 nil, Al_2O_3 0·36, Fe_2O_3 19·22, FeO 25·38, MnO 9·50, CaO 13·71, H_2O+ 2·34, H_2O- 0·03 = 99·83; sp. gr. 4·03. This shows an unusually high content of manganese, but no relation can be traced between the percentage of manganese and the axial ratios. L. J. S.

Piazza (Maria). *Contributo alla conoscenza della costituzione della calcofillite.* Periodico Min. Roma, 1931, vol. 2, pp. 104–121, 3 figs.

Crystals of chalcophyllite from Cornwall gave the forms *c m w v r d e* [Dana's letters], $x(10\bar{1}4)$, $y(02\bar{2}1)$, $s(20\bar{2}5)$, $t(20\bar{2}3)$, $n(07\bar{7}2)$, the last three being new forms, and the new axial ratio $a : c = 1 : 2{\cdot}6161$. Analysis gave As_2O_5 13·26, P_2O_5 0·64, SO_3 7·98, Al_2O_3 3·48, CuO 46·56, H_2O 28·21 = 100·13. This corresponds to a mixture of $2Cu_3(AsO_4)_2.13Cu(OH)_2.18H_2O$ with 22·14 % of $Al_2(SO_4)_3.18H_2O$. It is suggested that $2Al^{\cdots}$ and $3SO_4''$ can replace $3Cu^{\cdot\cdot}$ and $2AsO_4'''$ in the crystal lattice. Dehydration curves are given. [Cf. Min. Mag. **12**–120.] L. J. S.

Millosevich (F.). *Ematite nel talco di Orani (Sardegna).* Periodico Min. Roma, 1931, vol. 2, pp. 139–140.

Tabular crystals of haematite in steatite from Orani, Sardinia, show the forms *c a t d r e a s n* [Dana's letters] and a new inverse rhombohedron $(01\bar{1}3)$. L. J. S.

Zambonini (F.) & Caglioti (V.). *Nuove richerche sulla composizione chimica della romanechite.* Periodico Min. Roma, 1931, vol. 2, pp. 73–80.

– *Nouvelles recherches sur la composition chimique de la romanèchite.* Comp. Rend. Acad. Sci. Paris, 1931, vol. 192, pp. 750–753.

Analysis of botryoidal fibrous material from Romanèche, France, gave MnO_2 67·69, MnO 6·14, BaO 16·03, CaO 1·55, SrO 0·03, MgO 0·33, Fe_2O_3 0·05, Al_2O_3 0·25, CuO 0·046, PbO 0·094, ZnO 0·035, Na_2O 1·30, K_2O 0·60, Li_2O 0·0016, TiO_2 0·01, WO_3 0·16 As_2O_5 0·82, P_2O_5 0·015, SiO_2 0·34, H_2O 4·68 = 100·17, active oxygen 12·46. This gives a formula $H_2(Mn^{II},Ba)Mn_4O_{10}$. At 200° C. 1·40 % H_2O is lost,

and the remainder is expelled at 400° – 650° C. The basis of the crystalline structure of this and the allied minerals coronadite and hollandite may be regarded as $3MnO_2$ with replacement by $2BaMnO_3$, $2Mn_2O_3$, and $2Fe_2O_3$ (these groups having the same number of oxygen atoms and the same total valencies). X-ray examination led to no results. L. J. S.

Zambonini (F.) & Carobbi (G.). *Contributi allo studio dei minerali vesuviani. Ricerche sulla forsterite e sullo spinello.* Boll. Soc. Nat. Napoli, 1930, vol. 41 (for 1929), pp. 245–257.

A block from Monte Somma, Vesuvius, consisted almost entirely of crystalline grains of nearly colourless forsterite and octahedra of black spinel. Analysis of the forsterite gave : SiO_2 40·17, Al_2O_3 3·71, Fe_2O_3 1·00, FeO 2·59, MnO 0·29, MgO 49·27, CaO 2·63, SrO,BaO traces, NiO 0·005, CoO 0·005, CuO 0·006, SnO 0·006, Sb_2O_3 0·013, H_2O+ 0·27 = 99·965. The presence of small amounts of heavy metals is noteworthy. The alumina is assumed to be present as an orthorhombic modification of $Mg(Al,Fe)_2O_4$ (6 %) in isomorphous mixture with Mg_2SiO_4. The spinel gave : Al_2O_3 66·25, Fe_2O_3 5·32, FeO 0·62, MnO 0·18, MgO 25·92, CaO 1·69, NiO 0·007, CoO 0·003, CuO 0·004, SnO, Sb_2O_3 traces, SiO_2 0·28 = 100·27.

L. J. S.

Di Franco (S.). *Sulla szaboite del Monte Calvario (Etna).* Boll. Accad. Gioenia Sci. Nat. Catania, 1930, ser. 2, no. 60, pp. 33–38, 1 fig.

'Szaboite' is identical with hypersthene. Crystals show the forms *a b m z n o i u* [Dana's letters]. Optic axial plane (010), negative $Bx_a \perp(100)$; pleochroism, bright yellow to pale green. Analysis gave SiO_2 50·52, Al_2O_3 3·81, Fe_2O_3 3·79, FeO 16·22, MgO 22·73, CaO 2·40, H_2O 0·32 = 99·79 ; sp. gr. 3·47–3·49. L. J. S.

Azzini (F.). *La pirite del giacimento di Gavorrano-Ravi (Toscana).* Atti (Mem.) Soc. Toscana Sci. Nat., 1930, vol. 40, pp. 51–69, 2 pls.

Crystallographic study of 1815 crystals of pyrite from this locality. The following 24 forms are noted *a o* (15.1.0) *b α h γ ε f k η e* (13.7.0) (950) *g* h_l (24.12.5) *t s R Σ* (22.14.7) *n* (955); of these (22.14.7), vicinal to (321), is new for pyrite. The several combinations of forms are listed and their frequency noted. L. J. S.

Cavinato (A.). *Nuove ricerche sull'euclasio.—Euclasio di valle Aurina.* Atti (Rend.) R. Accad. Lincei, Cl. Sci. fis. mat. nat. Roma, 1929, ser. 6, vol. 10, pp. 656–664.

In a granosyenitic orthogneiss in the valle del Vento, valle Aurina, Alto Adige, the author collected a number of euclase crystals, colourless or slightly yellow and up to 2 cm. in length. They show the forms (010), (120), (100), (021), (011), (111), (121), (141), ($\bar{1}02$), and on some crystals also (340), (560), (430), (320), (310), (031), (151), ($\bar{1}01$), ($\bar{1}11$) [angles and axes not given]. Analysis gave SiO_2 40·78, Al_2O_3 34·46, Fe_2O_3 0·97, FeO 0·44, BeO 16·54, CaO 0·22, MgO 0·55, H_2O+ 6·15, H_2O- 0·13, F 0·12, total (less O for F) 100·31 ; sp. gr. 3·038.

Light of λ	...	...	6800 Å.	5890 Å.	5200 Å.	4600 Å.
α	...	...	1·6524	1·6528	1·6595	1·6662
β	...	...	1·6550	1·6560	1·6629	1·6695
γ	...	...	1·6720	1·6725	1·6803	1·6877
$\gamma : c$	...	...	41° 18′	41° 12′	41° 2′	40° 50′
2V	...	...	—	46° 38′	—	—
2E	...	...	—	81° 52′	—	—

The optic axial plane is parallel to b (010), and the optic sign positive. The dehydration was also studied: there is a small gradual loss of water up to 780° C., amounting to 0·62 %; between 780° and 820° C. a further 5·16 % is lost; and then the loss is again gradual, up to 6·37 % at 930° C. The reabsorption in moist air is very small after heating at moderate temperatures, the optics remain unaltered, but dehydration at 820° C. results in small changes in the refractive index, and larger changes in the extinction-angle $\gamma : c$. The optic axial plane remains parallel to b (010), and the crystals remain transparent. The new values are: $\gamma : c$ 41° (light of λ 6800 Å.), 38° (5890 Å.), 36° (5200 Å.), 29° (4600 Å.); α 1·6523, γ 1·6720. The crystal structure breaks down at 1300° C. M. H. H.

Orcel (J.). *Complément à l'analyse thermique des chlorites.* Bull. Soc. Franç. Min., 1929, vol. 52, pp. 194–197, 1 fig.

A supplement to thermal work on chlorites already described [M.A. **3**–151, 372]. The author studies the thermal changes when a ferriferous chlorite is heated (1) in vacuo, and (2) in a stream of nitrogen. The temperature curves show quite clearly an exothermal inflexion due to the heat produced by the action of water on the ferrous content. The exothermal reaction occurs at 775° C. and immediately precedes the second and normal endothermal one.

F. A. B.

Brun (Albert). *Note sur les constantes optiques de l'almandin, de la blende et du zircon.* Bull. Soc. Franç. Min., 1930, vol. 53, pp. 35–46.

Optical measurements and micro-chemical tests show that almandine and probably all other red garnets owe their colour and absorption spectra to the presence of copper oxide. Refractive index measurements on prisms cut from the same specimen of blende show variations outside the limits of error. Two different prisms gave n 2.3695 and n 2.3718 (Na-light). Specimens of pale yellow and green blende from different localities show a sharp absorption band $\lambda = 4047$ Å. Almost colourless blende does not transmit light of shorter wave-lengths. The author also gives accurate refractive index measurements of colourless zircon from $\lambda = 2795$ to $\lambda = 7699$Å. and finds no absorption bands over this range of wave-lengths.

F. A. B.

Cayeux (L.). *Patine des silex de la craie.* Bull. Soc. Franç. Min., 1930, vol. 53, pp. 60–72.

The patina of nodular flints from the chalk is composed of chalcedony, opal, and varying quantities of calcareous matter. Its formation is in most cases not due to weathering but probably dates from the formation of the flint itself. F. A. B.

Drugman (J.). *Macles de feldspaths et « heterozwillinge ».* Bull. Soc. Franç. Min., 1930, vol. 53, pp. 91–94.

A criticism of the term ' heterozwillinge '. The author prefers to consider these as complex groupings of twins, the latter twinned according to simple laws. F. A. B.

Drugman (Julien). *Note sur des quartz bipyramidés maclés de Four-la-Brouque, en Auvergne.* Bull. Soc. Franç. Min., 1930, vol. 53, pp. 95–104.

The author describes twins of β-quartz from this locality twinned according to (1) the Esterel law on $(10\bar{1}1)$, (2) the Verespatak law on $(11\bar{2}2)$, (3) the Zinnwald grouping on $(11\bar{2}2)$, (4) the Pierre Levée law on $(12\bar{3}3)$ or $(21\bar{3}3)$, and (5) the Breithaupt law on $(11\bar{2}1)$. The Zinnwald law is probably an accidental grouping. [Cf. Min. Mag. **21**–380.] F. A. B.

Piazza (Maria). *Trona del Lago Mandara (Fezzan).* Periodico Min. Roma, 1931, vol. 2, pp. 17–23, 1 fig.

Trona from the salt lake deposits of Lake Mandara, Fezzan, Libyan desert, south of Tripoli, is found in compact crusts of divergent

acicular fibres enclosed between layers of yellow sand. The hardness is 2·5 to 3, specific gravity 2·12 at 16° C. and the cleavage fragments carefully separated from sodium chloride yield on analysis CO_2 37·98, Na_2O 41·22, H_2O 19·13, Cl 0·86, SO_3 0·70, CaO 0·02, insol. 0·06, less O = Cl 0·19, total 99·78. These figures are close to those for pure trona; slight excess of $NaHCO_3$ is, however, indicated. The author suggests a mode of formation for this trona occurrence. [M.A. **2**–47; Min. Mag. **22**–53.] F. A. B.

Parker (Robert L.) & Kennedy (W. Q.). *Beobachtungen an einem Pyritkristall von Traversella.* Schweiz. Min. Petr. Mitt., 1929, vol. 9, pp. 200–204, 3 figs.

A crystal of pyrite from Traversella, Piedmont, with the forms *a e o n p s* [Dana's letters] shows well-marked bands of light-figures in the zones [110] and [100], less prominently in [121] and [021], and none in [111]. Statistics of 189 forms of pyrite show the percentage numbers of forms lying in these zones to be respectively 25, 31, 15·9, 19·6, and 5·3. L. J. S.

Rosický (Vojtěch). *Die Drusenminerale des Andesites von Nezdenice in Mähren.* Festschrift Victor Goldschmidt, Heidelberg, 1928, pp. 229–242, 5 figs.

Cavities in a vesicular andesite contain minute crystals of various minerals. Cristobalite as cloudy, sometimes clear, octahedra with small *a d* and new (331); sp. gr. 2·354; optical anomalies disappear at 234½–242½° on heating, and reappear at 194½–175° on cooling. Tridymite as clear plates *c m p* and *e* (10$\bar{1}$3), twinned on *q* (10$\bar{1}$6); sp. gr. 2·277; optical anomalies disappear at 144–163° on heating, and reappear at 140–117° on cooling. Chalybite rhombohedra gave FeO 39·39, MgO 6·31, CaO 11·72, insol. 4·06 %. Ferrocalcite as white radiating aggregates. Other minerals mentioned are molybdenite, pyrite, and chlorite. L. J. S.

Koechlin (R.). *Über ein Mineral aus der Olivingruppe vom Vesuv.* Centr. Min., Abt. A, 1930, pp. 375–380, 1 fig.

A specimen with leucite, nepheline, hornblende, &c., from Vesuvius, shows in cavities minute transparent brown crystals of a ferriferous olivine near fayalite. $a : b : c = 0{\cdot}46185 : 1 : 0{\cdot}58397$, forms *a b c m s k d e* [Dana's letters]. Optic axial plane (001), $Bx_a \perp (010)$, 2V 65°, negative. L. J. S.

O'Daniel (H.). *Über Tarnowitzite.* Zeits. Krist., 1930, vol. 75, pp. 576–577.

In his recent paper [M.A. **4**–383] the author placed the maximum content of $PbCO_3$ in mixed crystals with aragonite at about 5 %. He now finds that S. P. Stevanović has described tarnowitzite containing 18·19 % $PbCO_3$ [M.A. **2**–116]. L. J. S.

O'Daniel (H.). *Ein chromhaltiger Pyroxen von Jagersfontein (Südafrika).* Zeits. Krist., 1930, vol. 75, p. 575.

A dark-green pyroxene from the 'blue ground' is described whose refractive indices α, β, γ for sodium-light are respectively 1·6722, 1·6847, 1·7015 and whose percentage composition is SiO_2 53·53, Al_2O_3 1·30, Cr_2O_3 1·96, FeO 2·10, CaO 22·96, MgO 17·88; total 99·73. H. H.

Dittler (E.) & Hueber (H.). *Mottramit aus Bolivia.* Min. Petr. Mitt. (Tschermak), 1931, vol. 41, pp. 173–179.

Small dark olive-green nodules with yellowish weathered crust occur in Cretaceous sandstone midway between Caxata and Yaco, dept. La Paz. Indistinct crystals gave unreliable measurements. Analysis I.

	V_2O_5.	As_2O_5.	P_2O_5.	PbO.	CuO.	ZnO.	FeO.	H_2O+.	Insol.	Total.	Sp.gr.
I.	21·89	trace	—	53·76	17·72	1·25	0·46	2·23	2·25	'100·36'	6·416
II.	21·35	1·79	trace	52·87	0·04	21·65	—	2·31	—	100·01	6·393
III.	22·55	trace	0·05	53·54	6·76	14·84	0·06	2·14	0·32	100·26	5·677
IV.	22·56	trace	0·07	53·01	8·79	13·04	—	2·47	—	99·94	6·248

I, also $H_2O(-110°)$ 0·48, Cl trace. II, Cl trace.

Analysis II of crystals of descloizite from Abenab; III, massive cuprodescloizite from Olifantsfontein; IV, crystals of cuprodescloizite from Olifantsfontein, Otavi Mts., South-West Africa. All these analyses approximate to the formula $2R^{II}_3V_2O_8.R^{II}(OH)_2$. The difference in the water content of mottramite and descloizite [M.A. **4**–382] is believed to be unessential. L. J. S.

Palache (Charles), Davidson (S. C.), & Goranson (E. A.). *The hiddenite deposit in Alexander County, North Carolina.* Amer. Min., 1930, vol. 15, pp. 280–302, 1 pl., 11 text-figs. [Cf. M.A. **3**–440.]

A pegmatite stage with 'lit-par-lit' intrusion into the gneisses of the country-rock, is followed by a hiddenite pegmatite stage along

the foliation planes of the gneiss. After some shearing of this complex, cavities analogous to the Alpine crevices were lined with the gem hiddenite and a variety of other crystallized minerals. The minerals described are quartz and amethyst; adularia of unusual habit with the forms *c b a ζ*, *μ* (310), *m z Δ q x n e o* [Dana's letters]; hiddenite, the crystals mostly flattened and twinned on (100), with the forms *a b m μ n Z F p φ D r ϵ t*, and *N* (310), *B* (210) new for spodumene. Holmquistite, a lithium-amphibole, is found as a bluish band of ragged grains and fibres in a metamorphic schist near the pegmatite contact; the prism-angle is 54° 39′, *α* 1·625 (light yellow), *β* 1·645 (violet), *α* 1·654 (purplish-violet), *γ* : *c* about 0°, 2V 51°, sp. gr. 3·111; analysis by E. V. Shannon, SiO_2 55·48, TiO_2 0·64, Al_2O_3 14·64, Fe_2O_3 1·80, FeO 10·36, MnO trace, MgO 9·40, CaO 1·32. Na_2O 0·66, K_2O 0·74, Li_2O 2·40, H_2O+ 3·16, F trace = 100·60, gives a formula

$$3[Li_2(Mg,Fe)_3Al_2Si_8O_{22}(OH)_2] + 1[Ca_2(Mg,Fe)_3Al_2(Al_2Si_6)O_{22}(OH)_2].$$

Beryl, sometimes emerald-green in colour, shows the forms *c m a p u d s v n v*. Rutile as brilliant crystals, usually slender needles or twinned on (101) or (301); forms *c a m x h r e s*, *E* (117), *α β z t*, and new *D* (118), *F* (115), *H* (229), *L* (131). Monazite as tiny honey-yellow crystals, *a b c e w r v s o*. Mispickel, as minute brilliant crystals embedded in calcite; forms *m e ρ t n q w* [Dana's letters] and *o* (112), *A* (533), *B* (514). Other minerals mentioned are tourmaline, garnet, muscovite, nontronite, apatite, calcite, ankerite, chalybite, aragonite.

L. J. S.

Hess (Frank L.) & Wells (Roger C.). *Samarskite from Petaca, New Mexico.* Amer. Journ. Sci., 1930, ser. 5, vol. 19, pp. 17–26, 2 figs.

Grains and lumps of a black mineral in a pegmatite vein when sliced and polished show a lack of homogeneity, and their radiograms on a photographic plate show areas of varying intensity. Analyses I of the more strongly radioactive portion (sp. gr. 5·22) and II of the less radioactive.

	Nb_2O_5.	Ta_2O_5.	TiO_2.	SnO_2.	UO_2.	UO_3.	ThO_2.	CeO_2.	La_2O_3.
I.	41·39	7·27	4·29	0·02	4·85	7·67	1·58	0·31	trace
II.	41·29	1·19	1·38	0·02	1·88	3·84	1·10	0·56	trace

	$(Yt,Er)_2O_3$.	Fe_2O_3.	MnO.	ZnO.	CaO.	PbO.	Bi_2O_3.	Ign.	n.d.	Total.
I.	17·64	5·85	0·89	0·04	4·22	0·43	0·02	2·06	0·27	'98·81'
II.	37·69	1·36	0·59	0·05	2·98	0·11	0·04	3·27	1·03	98·38

I corresponds with a pyroniobate $2Yt_2O_3.3Nb_2O_5$, and II with an orthoniobate $Yt_2O_3.Nb_2O_5$. The ages are about 300 and 150 million years respectively. The radial cracking around the masses is thought to be due to the later introduction of part of the material, corresponding with the successive replacements in the pegmatite [M.A. **3**–36]. L. J. S.

Bjørlykke (Harald). *Blomstrandin von Kåbuland.* Norsk Geol. Tidsskrift, 1930, vol. 11, pp. 232–239, 3 figs.

Blomstrandine has been found in considerable quantity (500 kg.) in a felspar quarry on the Kåbuland farm, near Iveland in Setesdal, Norway. It is black with a bright semi-metallic lustre, and forms large blades with xenotime, orthite, felspar, quartz, and magnetite in the intervening angular spaces. It is mostly amorphous, but shows some birefringent portions. Rough crystals of the blomstrandite type and of the euxenite type are rare. Analysis of the former gave $Nb_2O_5 + Ta_2O_5$ 19·11, TiO_2 31·84, UO_2 3·78, UO_3 nil, ThO_2 1·46, rare-earths 35·16, FeO 4·30, MgO 0·38, CaO 0·88, ign. loss 3·70 = 100·61. Spectrographic X-ray analysis of the rare-earths precipitate showed the presence of Yt, Th, Hf, Cp, Yb, Tu, Er, Ho, Dy, Tb, Gd, Sm, Nd; and in the Nb-Ta precipitate the intensities of the spectral lines indicated Ta_2O_5 about 5 %. A direct spectrographic X-ray analysis of the powdered mineral (of both the blomstrandine and the euxenite types of crystals) showed the presence of the same elements, though the intensities of the lines were not the same as with the precipitates; still this method affords a rapid means for the determination of rare-earth minerals. L. J. S.

Sundius (N.). *Iron-rhodonite from Tuna Hästberg.* Geol. För. Förh. Stockholm, 1931, vol. 52 (for 1930), pp. 403–406, 1 fig.

An iron-rich rhodonite from Tuna Hästberg, Sweden, had very nearly the same optic orientation as ordinary rhodonites and gave the following analytical and optical data (analysis by A. Bygdén): SiO_2 47·78 %, Al_2O_3 0·08, Fe_2O_3 0·11, FeO 14·51, MnO 29·20, CaO 6·55, MgO 1·93, H_2O 0·09; total 100·25; sp. gr. 3·653; α 1·725, β 1·728, γ 1·737; $\gamma - \alpha$ 0·013, $\beta - \alpha$ 0·0045; 2V 70·3°, positive. Introduction of iron raises the refractive index and specific gravity, but has little effect on the optic orientation, the birefringence, or the optic axial angle. The original specimen of 'iron-rhodonite' of

M. Weibull (1884) from Vester Silvberg, Sweden, was re-examined and found to be identical with sobralite and not isomorphous with rhodonite; it is proposed to transfer the name 'iron-rhodonite' to material such as that now described, which is isomorphous with rhodonite.

M. H. H.

Sundius (N.). *The optical properties of manganese-poor grünerites and cummingtonites compared with those of manganiferous members.* Amer. Journ. Sci., 1931, ser. 5, vol. 21, pp. 330–344, 3 figs.

New analyses by A. Bygdén of grunerite from I, Michigamme, Marquette district, Michigan; and II, [cummingtonite ?] Cummington, Massachusetts.

	SiO_2.	Al_2O_3.	Fe_2O_3.	FeO.	MnO.	MgO.	Na_2O.	$H_2O(+105°)$.	Total.
I.	52·22	0·58	0·42	29·45	3·21	12·04	trace	2·12	100·04
II.	50·79	0·34	0·89	38·43	1·12	6·50	trace	2·00	100·07

	$FeSiO_3$.	$MnSiO_3$.	$MgSiO_3$.	Sp. gr.	α.	β.	γ.	$2V_\alpha$.	$c:\gamma$.
I.	54·47	5·94	39·58	3·35	1·655	1·669	1·686	93°	17°
II.	75·35	2·18	22·47	3·443	1·666	1·684	1·704	90°	14°

These and quoted analyses with the corresponding optical data are grouped into two series with $MnSiO_3$ up to 6 % and $MnSiO_3$ 11·6–20·6 %. A plot shows an increase in sp. gr., refractive indices, and $\gamma - \alpha$ with increasing $(Fe,Mn)SiO_3$, but the effect of manganese alone cannot be differentiated. A partial analysis and optical determinations on kupfferite from Lake Baikal and Ural suggest that this is an actinolite. [Cf. Min. Mag. **22**–477.] L. J. S.

Wong (W. H.) & Wang (S. W.). *On some crystals of topaz from Mongolia and north and central China.* Bull. Geol. Soc. China, 1930, vol. 9, pp. 105–117, 1 pl., 6 text-figs.

Descriptions are given of five isolated crystals of topaz, a mineral supposed to be new for China. A crystal ($5 \times 5\frac{1}{2}$ cm.) from north of Urga, Mongolia [Cf. M.A. **3**–439], shows the forms *m l f* [Dana's letters]; sp. gr. 3·52. Three colourless or tea-yellow crystals from Hunyuan, prov. Shansi; forms *c m l y f X d u o i*, and new (776) as a single corroded face at the lower end of the crystal; sp. gr. 3·54–3·56. A colourless crystal ($4\frac{1}{2} \times 2\frac{1}{2}$ cm.) from Haichou, prov. Kiangsu; forms *m l y f o*; sp. gr. 3·56. L. J. S.